Aalto University
School of Business

BUSINESS ALLIANCES – A STUDY OF ABNORMAL RETURNS IN THE NORDIC STOCK MARKET

Master's Thesis
Juho Mäkelä
Aalto University School of Business
Finance
Fall 2019

Author Juho Mäkelä

Title of thesis Business alliances – a study of abnormal returns in the Nordic stock market

Degree Master of Science (Economics and Business Administration)

Degree programme Finance

Thesis advisor(s) Peter Nyberg

Year of approval 2019 **Number of pages** 87 + 6 **Language** English

Abstract

My study examines 1264 business alliance announcements made by public companies in the Nordic stock market during 2000-2018 to evaluate whether such announcements generally produce abnormal stock market returns for the announcing firms. My study also assesses the types of business alliance announcements that produce the most significant abnormal effect on the stock price in the Nordics. The analysis is conducted with event study methodology including three different estimation models for increased statistical robustness. My results show that business alliances, both joint ventures and strategic alliances, generate a statistically significant cumulative average abnormal return of 1.40% during a three-day announcement period consisting of the day before the announcement, the announcement date, and the day after the announcement. The positive market reaction is most prominent in small cap firms as they produce a significant 5.74% cumulative average abnormal return during the three-day announcement period which is significantly higher than the 0.20% produced by large cap firms. However, I am generally unable to find other significant differences between the cumulative average abnormal returns between specific business alliance types although I find some evidence of business alliances with foreign partners outperforming alliances with domestic partners and high-technology business alliances underperforming compared to other alliances in the Nordic stock market.

Keywords Business alliances, joint ventures, strategic alliances, event study, Nordic stock market

Tekijä Juho Mäkelä

Työn nimi Yritysten välinen yhteistyö – yhteisyritykset ja strategiset liitot Pohjoismaissa

Tutkinto Kauppatieteiden maisteri

Koulutusohjelma Rahoitus

Työn ohjaaja(t) Peter Nyberg

Hyväksymisvuosi 2019 **Sivumäärä** 87 + 6 **Kieli** Englanti

Tiivistelmä

Tutkielmani tarkastelee 1264:ää Pohjoismaisen julkisen osakeyhtiön tekemää julkista tiedotetta yritysten välisestä yhteistyöstä tämän vuosituhannen aikana. Tarkoituksena on selvittää, tuottavatko kyseiset yhteistyön julkaisut markkinakorjattua ylimääräistä tuottoa niitä julkaiseville yrityksille. Tutkielmani myös pohtii, minkä tyyppiset yritysyhteistyömuodot aiheuttavat merkittävimpiä positiivisia osakemarkkinareaktioita Pohjoismaissa. Analyysini perustuu tapahtumatutkimukseen, joka sisältää kolme erilaista ennustemallia paremman tilastollisen merkittävyyden saavuttamiseksi. Tulokseni osoittavat, että yhteisyritykset ja strategiset liitot tuottavat keskimäärin 1.40% markkinakorjattua ylimääräistä tuottoa kolmen päivän julkaisuaikavälin sisällä. Ylimääräinen tuotto on huomattavin pienten yritysten keskuudessa, jotka tuottavat keskimäärin 5.74% markkinakorjattua ylimääräistä tuottoa kyseisellä aikavälillä. Tulos on huomattavasti korkeampi verrattuna suurten yritysten vastaavaan, joiden markkinakorjattu keskimääräinen ylimääräinen tuotto samalla ajanjaksolla on 0.20%. En kuitenkaan löydä muita tilastollisesti hyvin merkittäviä tekijöitä verratessa yritysten välisiä yhteistyöjulkaisuja niiden eri luonteenpiirteiden perusteella. Havaitsen kuitenkin, että yritysyhteistyön julkaiseminen ulkomaisten yhteistyökumppaneiden kanssa tuottaa jonkin verran enemmän markkinakorjattua ylimääräistä tuottoa kotimaisiin yhteistyökumppaneihin verrattuna ja että korkean teknologian yritysyhteistyön julkaiseminen tuottaa hieman vähemmän markkinakorjattua ylimääräistä tuottoa muihin julkaisuihin verrattuna Pohjoismaiden osakemarkkinoilla.

Avainsanat Yritysyhteistyö, yhteisyritykset, strategiset liitot, tapahtumatutkimus, Pohjoismaiden osakemarkkinat

Contents

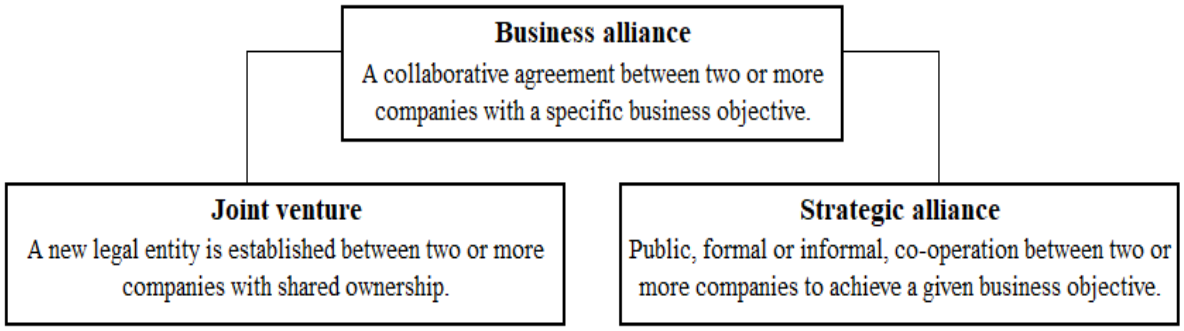
List of tables

List of figures

1. Introduction

Business alliances such as joint ventures and strategic alliances have attracted attention from many fields of study and there exists significant theoretical diversity on why such forms of co-operation are practiced. There exists a dilemma, especially in management literature, on what should be called an "alliance", a "partnership", or "co-operation", and all these terms and many others, are often used interchangeably. In my paper, all alliances have been publicly announced, often directly in the stock exchange, therefore making them truly "business alliances". To clarify the terminology in my paper, a strategic alliance is considered a formal or informal partnership where the parent firms do not form a new separate legal entity opposed to a joint venture where a new entity with more explicit obligations and commitments is established. Both strategic alliances and joint ventures are considered business alliances in my paper. Figure 1 demonstrates the distinction graphically.

Figure 1: The specification of two different types of business alliances
The below figure illustrates the division of business alliances into joint ventures and strategic alliances in my study. There exists multiple definitions in literature on what should be considered an "alliance", especially in management literature. In my paper, every public announcement of co-operation with a business intent is considered a business alliance. I will examine two types of business alliances, joint ventures and strategic alliances. When the business alliance involves the formation of a new legal entity, it is considered a joint venture. Otherwise, the business alliance is considered a strategic alliance.



The prevalent view is that business alliances are an important vehicle for value creation and that they generally create economic value (Kale et al., 2002). Often, the value creation is attributed to synergies similarly to mergers and acquisitions (McConnell and Nantell, 1985), lower transaction costs (Hennart, 1988), and interfirm learning (Arino and De La Torre, 1998). Some other popular explanations as to why business alliances may be preferred over mergers and acquisitions include reduction of mispricing, better risk management, effective transfer of key technologies, less severe agency problems, and contractual efficiencies (Das et al., 1998).

1.1 Contribution

My paper contributes to the existing literature by answering two key questions. First, I will examine whether business alliances are in general value creating in the Nordic stock market during the current millennium. Second, I will broadly examine what specific company specific and business alliance specific characteristics generate the most value for shareholders. For instance, characteristics related to firm size, internationality, industry relatedness, and technology will be evaluated. Event study analysis will be the core methodology behind the results. The abnormal returns derived by the event study methodology are robust with three different estimation models. Furthermore, the sample size is large with 1264 observations. The Nordic setting for my research is also unique. To my knowledge, no research relating to business alliances and their stock market performance has been conducted earlier in the Nordics. Finally, the findings are further tested for robustness with a multiple regression model which aims to specify the most important characteristics of a successful business alliance while controlling for multiple other variables. All results in my study are presented with clear graphs and tables for unambiguous and easy interpretation.

The result-oriented contribution of my study can be summarized in three main findings. First, my results show that announcing business alliances generally produce positive cumulative abnormal returns in the Nordic stock market for the announcing firms and that there is no significant difference between the abnormal returns for firms announcing joint ventures and strategic alliances. The cumulative average abnormal return of 1.40% for all business alliances during the three-day announcement period is statistically very significant. Second, my findings imply a strong premium for small firms announcing business alliances. The three-day announcement period cumulative average abnormal return for small cap firms is 5.74% whereas it is only 0.20% for large cap firms. The small firm premium is also supported by the multiple regression analysis in my study. Third and finally, I generally do not find consistent statistical significance between the cumulative average abnormal returns of firms announcing different types of business alliances considering the entire 21-day event window beginning ten days before the announcement date and ending ten days after it. Firms announcing a business alliance with a foreign partner and firms announcing a business alliance in the high-technology industry are the exception. The former type tends to outperform other business alliances and the latter tends to underperform compared to other business alliances. However, the overall evidence is not definitive enough to draw very reliable conclusions on the matter.

2. Literature review

The literature review section of my paper will discuss the theoretical background behind the motives and objectives of forming business alliances as well as their advantages and disadvantages. The section begins by taking a deeper look at joint ventures and ends with an overview of strategic alliances.

2.1 Joint ventures

Joint ventures are business agreements where two or more partners create a separate legal entity together to achieve certain business objectives (Harrigan, 1988). In a broader sense, joint ventures also represent special cases of capital investment projects where resources from two or more companies are combined to achieve the given objectives under the combined management from the parent companies (McConnell and Nantell, 1985). The original management teams for all the participating companies remain intact under a joint venture whereas usually one or more management teams are replaced under the more traditional mergers and acquisitions. Some of the main motives to form joint ventures include acquiring new technologies, utilizing economies of scale through an extension of product lines, and receiving valuable government contracts in a cost-effective manner (McConnell and Nantell, 1985). They can also be used to coordinate the management of excess capacity in mature and concentrated industries. Harrigan (1988) discusses two basic strategic motives for joint ventures: first, they augment internal strengths by concentrating resources in areas where the firm has a leading position. Second, they improve the firm's competitive position and help it to adjust accordingly as an industry or market evolves and changes through time. In fact, joint ventures have been widely used by corporations as a tool to improve entrepreneurial capabilities and long-term competitiveness as they are valuable interfirm linkages enhancing the innovative capabilities of corporations by promoting opportunities for shared learning, transfer of technical knowledge, legitimacy, and resource exchange (Park and Kim, 1997). Joint ventures, in combination with other co-operative arrangements, can be used to weaken competition, to stabilize profit levels, and to initiate structural changes in other industry traits (Harrigan, 1988). For instance, the role of joint ventures in reducing competition first caught the eye of industrial economists before business strategists. The main function of joint ventures was shown to be the minimization of competition in this early research (Hennart, 1988).

Reuer and Koza (2000) discuss that there are more than a dozen reasons why firms could engage in interorganizational collaboration through joint ventures. Some popular reasons include lower transaction costs, scale economies, adjusting to competition, easily obtainable synergies, and reduction of asymmetric information. The resource dependence theory suggests that firms form joint ventures to obtain resources they would otherwise lack. Hennart (1988) argues that whenever the assets needed by a firm are public goods, it is more expensive to replicate than to acquire them. However, if the assets are also firm-specific, an acquisition could result, for example, in an undesired labor force. This would mean more management costs and cultural problems leading into economical inefficiencies. If the acquiring firm expects it will experience significant problems in managing the target, it might prefer a joint venture over an acquisition.

As mentioned earlier, two or more parent firms combine their resources and form a new legal entity to achieve certain business objectives when they form a joint venture. Hennart (1988) divides these objectives into four key parts. First, joint ventures take advantage of economies of scale. Second, they overcome possible entry barriers for new markets. Third, they pool complementary pieces of assets and knowledge. Fourth, they can also reduce xenophobic reactions when entering a foreign market. Hennart (1988) further sorts joint ventures into two types, scale joint ventures and link joint ventures. Scale joint ventures aim to enter a contiguous stage of production or distribution or aim to enter a new market. The position of the partners is similar in a scale joint venture. These positions include forward or backward vertical integration, horizontal expansion, and diversification. However, in link joint ventures the position of the partners is not similar as one partner may be diversifying and the other partner may be integrating vertically, for instance. An example of a link joint venture is a venture where one partner is generating the output and the other is responsible for the marketing and distribution of the products and services.

Koh and Venkatraman (1991) examine joint ventures by dividing them into four types using two dimensions. The dimensions are the theoretical perspective and the focus on research. The theoretical dimension includes strategic behaviour and transaction costs. The research dimension includes motives for the formation of joint ventures and their impact on firm performance. The first type of study concerns strategic motives to form joint ventures. The motives include the desire to offer distinct products and services which relate to enhancement of market power and operating efficiency. The second type of study seeks to explain the effectiveness of joint venture strategies and is concerned with two key questions, the impact of

joint venture formation and the conditions under which joint ventures have the greatest impact. The third type of study is based on the transaction cost perspective and aims to explain joint venture formation with minimization of production and coordination costs by comparing joint ventures to other governance mechanisms such as vertical integration and long-term contracts. The fourth and final type of study is the effectiveness of governance mechanisms which seeks to measure the performance of firms adopting the previously mentioned best minimization of production and coordination costs.

Koh and Venkatraman (1991) also discuss the value-creating or value-destroying mechanisms of joint ventures. These mechanisms include the potential benefits, potential costs, and rationales for joint venture formation. The extensive benefits of joint ventures are divided into four main categories. First, economies of scale are utilized when two or more partners combine their activities under one entity. Second, the partners have access to complementary assets. This includes the pooling of different kinds of assets in various business areas such as production, marketing, design, and manufacturing. Third, the parent firms can share costs and risks which is especially useful when investing in projects that require extensive research and development costs under uncertain demand combined with short product or technology life cycles. A joint venture participant may also effectively shape the scope of competition by pre-empting existing and potential competitors with a first-mover advantage. Fourth, the last value creating mechanism of joint venture formation is the key rationale behind it. Some popular rationales include gaining fast access to new technology and markets along with the economies of scale and risk sharing among the parent firms beyond the scope attainable by a single organization alone.

Joint ventures also embed costs. Koh and Venkatraman (1991) discuss three categories of these potential costs. First, joint ventures include coordination costs between partners which might be significant if the interests between the partners are not aligned. Second, joint ventures may result in erosion of competitive advantage should too much firm-specific expertise be passed on to the other partner. Furthermore, the competitive advantage may diminish should the formation of joint ventures lower the barriers of entry for competitors. Third, forming a joint venture may create an adverse bargaining position for the other partner as it may have committed to irreversible investments. This enables the other partner to behave opportunistically in negotiations and capture a disproportionate share of the joint venture's value.

Chung et al. (1993) focus on international joint ventures in their research. The rationale for joint ventures discussed by them is very similar to Koh and Venkatraman's (1991) arguments. They mention that particularly the reduction of research and development costs in high technology industries could be key main driver behind joint venture activity in an international setting as many high-end technologies may be too high for a firm to pay alone. Furthermore, some companies might not have the necessary expertise to successfully execute the research process on their own. Other important drivers behind international joint ventures include market expansion, scale economies, reduction of risks through portfolio diversification, and the option for future co-operation, for instance, in the form of strategic alliances. Chung et al. (1993) also determine two key costs of forming international joint ventures. First, victimization may occur when the other partner takes advantage of the venture and leaves the other partner with diminished control over innovative technology, differentiated products, trademarks and brand names. Second, joint ventures may lead into managerial conflicts when decision making is divided among the partners. For instance, the partners may have different views on reinvestment policy, pricing, accounting policies, marketing strategies, investments on new products, and the promotion of managers. Furthermore, cultural differences, varying organizational structures, and incompatible key information technology systems may lead to further problems. There also exists a potential problem in forming a joint venture that arises from the employment relationship between managers assigned to the venture and their parent organizations. Joint venture managers often pursue personal goals that may be misaligned from the goals of the parent firms. This in turn aggravates the problem of effectively monitoring the behaviour of the venture managers since joint ventures are typically formed in relatively new and risky environments with high amounts of uncertainty. Managerial misbehaviour is thus harder to notice (Park and Kim, 1997).

Overall, the managerial motives to establish joint ventures are very similar to mergers and acquisitions and the bulk of previous research has assumed that they have similar financial implications compared to mergers and acquisitions (Park and Kim, 1997). Since it is not possible to identify acquired and acquiring firms in joint ventures, it seems reasonable that the estimated average wealth increase for all firms involved in joint ventures should lie somewhere between those for acquired and acquiring companies in mergers and acquisitions (McConnell and Nantell, 1985). As is the case for mergers and acquisitions, joint ventures should therefore show comparable potential synergy gains from pooling resources since they represent similar

economic phenomena. Hennart and Reddy (1997) argue that joint ventures are attractive compared to mergers and acquisitions especially ex-post when firms would otherwise face substantial costs of integrating targeted assets. The post-acquisition integration problem is more likely when the target firm is relatively large and has a non-divisionalized organizational structure resulting in an "indigestibility" problem of acquired assets. The indigestibility theory assumes joint ventures are preferred when the desired assets of the target are embedded with undesired assets since an acquisition in this case would be problematic. The indigestibility problem can be avoided, at least to some extent, with joint ventures, as joint ventures only combine a subset of firms' resources whereas mergers and acquisitions usually combine all the resources.

Hennart and Reddy (1997) also discuss the potential ex-ante benefits of joint ventures compared to mergers and acquisitions. Joint ventures may be able to reduce the uncertainty and costs of valuing complementary assets before the transaction as the goals of the companies are likely more aligned when they decide to form a joint venture. This view of asymmetric information implies that companies prefer joint ventures over mergers and acquisitions if enough resource valuation problems exist due to a large disparity of information between the buyer and seller. The asymmetric information problem may also be emphasized due to the seller's difficulty in signaling the true value of its assets. As suggested by Balakrishnan and Koza (1993), joint ventures also offer the possibility to "learn" the true value of the assets which further reduces the problem of asymmetric information. In conclusion, the decreased asymmetric information provided by joint ventures compared to mergers and acquisitions will likely result in overall lower transaction costs. Furthermore, Hennart and Reddy (1997) predict that joint ventures are preferable when the target and buyer belong to different industries since an acquisition of this type has increased asymmetric information and higher transaction costs. Cultural differences combined with governmental and institutional barriers also play a role. Joint ventures could be attractive especially when diversifying to new markets and products as they reduce the impact of adverse selection through asymmetric information since the objectives of the parties involved are more aligned compared to mergers and acquisitions. The disparity between the buyer and seller is less prominent. Furthermore, post integration challenges of joint ventures are less significant compared to acquisitions when neither firm ceases to exist. Thus, managing potential cultural differences and employee turnover may become easier. Reuer and Koza (2000) revisit Hennart and Reddy's (1997) ex-post indigestibility theory and ex-ante increased transaction cost theory caused by asymmetric information. Whereas Hennart and Reddy (1997)

regard these two theories competing, Reuer and Koza (2000) regard them as complementary. They argue that firms must struggle with both problems at the same time when deciding to form a joint venture. Even if the indigestibility problem doesn't exist, firms are at risk of overpaying in an acquisition. Furthermore, the acquired assets may be indivisible instead of indigestible due to different organizational cultures and routines which may shape the parties to prefer a joint venture instead of a merger or an acquisition. Moreover, the ex-ante transaction costs may be more significant if the desired assets are embedded and shared rather than isolated within a semi-autonomous division of the target company.

Joint ventures among some other corporate investments can also be considered as a specific form of real options since they offer valuable opportunities to expand under conditions of uncertainty. Kogut (1991) discusses two main forms of joint venture real option strategies. The first strategy is waiting to invest where it pays to wait before committing more resources. The second real option strategy considers the right to expand in the future. Joint ventures provide valuable growth options because the parent firms can reduce potential downside losses to an initial, limited commitment, as well as position themselves to expand in the future given that circumstances turn out favorably (Tong et al., 2008). Therefore, joint ventures as real options are especially useful tools as a response to future market and technological developments in risky markets. Furthermore, they are an attractive mechanism as they offer the benefit of sharing risks and reducing overall investment costs. This is supported by the prevalence of organizational theories suggesting that firms engage in co-operative ventures as buffers against uncertainty (Kogut, 1991). The real option embedded in a joint venture can be exercised if one of the partners decides to finally acquire the joint venture or if the partners mutually decide to commit further capital into the project. Sometimes, the partners may even opt for an option arrangement already during the joint venture announcement. For instance, one partner may have a right to sell its stake in the venture at some point in the future. Timing of exercising the real option plays an important role and should ideally follow a product or a market signal indicating an increase in the joint venture's valuation. However, the real option value is not equal for both partners. For example, differences in option valuation can arise if the potential spill-over effects of the venture's technology complement the product portfolio of one partner more than the other (Kogut, 1991).

2.2 Strategic alliances

Strategic alliances are very similar to joint ventures regarding their business objectives and many aspects discussed earlier also apply to them. Strategic alliances are formed to share resources between two or more companies often in product design, production, marketing, or distribution. They take many forms which vary from simple agreements to even equity ties. Furthermore, strategic alliances involve mutual commitment from all the participating partners but have less impact on the partner firms' operations than joint ventures as they do not create a new legal entity, do not involve cross-partner equity investments, and do not pool resources indefinitely. The strategic alliances, like joint ventures, enable firms to obtain capabilities and synergies they would otherwise lack from the marketplace. For instance, a firm may contribute its expertise to the strategic alliance and simultaneously gain access to special resources or competencies which would otherwise be out of reach or significantly costly for it to obtain (Chan et al., 1997).

Das et al. (1998) argue that strategic alliances are value creating because they reduce negotiation, coordination, and monitoring costs. Furthermore, their long-term strategic benefits potentially far outweigh their short-term cost-benefit considerations. One way for strategic alliances to create value is by stimulating demand by strategies such as cross-selling, sharing of brand names, advertising, distribution channels, and more effective sales forces and networks. The announcements of strategic alliances also provide investors with information about a firm’s future plans, thus resolving some potential uncertainties. Chan et al. (1997) mention that strategic alliances may also add value by creating an organizational mechanism that better aligns decision authority with decision knowledge. In the optimal case, each strategic alliance partner has a specific decision responsibility for one element of the overall business objective and reaps the rewards and penalties associated with its own individual performance. In a strategic alliance, all profits accrue directly to the partners and do not fall under the discretionary control of the management of a joint venture company or an integrated corporation. Since strategic alliances do not create a new organizational entity, they avoid the agency costs associated with management's reluctance to release resources under their control once there is no more need for them. Strategic alliances may also add value through operational flexibility as they can create new links or disband quickly in response to changing market environments. Often, strategic alliance partners sign new agreements that expand or strengthen their business relationship (Chan et al., 1997). The role of long relationships between firms

forming strategic alliances has also been studied. Anand and Khanna (2000) emphasize the effect of learning when forming alliances as they found that firms with greater previous alliance experience generate significantly higher stock market returns compared to firms without the prior experience. Kale et al. (2002) confirm this finding and discuss several reasons as to why the previous experience with a given partner could be beneficial. First, a company may have greater commitment to make the alliance work given the prior successful co-operation. Second, prior experience helps the firm to build partner-specific routines of coordinating resources and tasks.

Strategic alliances also have disadvantages. One disadvantage is the opportunistic behavior of one or multiple partners resulting in uneven distribution of value between the partners. Chan et al. (1997) mention that one consequence of this opportunism is that firms incur costs in searching reliable partners, in designing contracts to reduce opportunistic behavior, and in monitoring the actions of other strategic alliance partners. As a result, partners will more likely pool their resources rather than share key specialized knowledge to maintain a competitive advantage. Furthermore, Das et al. (1998) argue that the decision to form a strategic alliance might also stem from poor corporate governance. When the control and ownership are separated, managers no longer bear the full consequences of their actions. Managers may therefore form strategic alliances to protect their own position by making the company more diversified at the cost of shareholders. It is likely that not all strategic alliances are entered with the best interest of stockholders in mind and that managers are extracting private benefits at least to some extent. The terms of the strategic alliance contracts are often formal and flexible which may lead to renegotiation and opportunistic behavior with the potential to destroy value. For instance, due to a perhaps non-binding contract, a partner may have the option to bail out from the strategic alliance leaving the other partner to pay all the costs of an unsuccessful business opportunity. Thus, the explorative first mover is at a potential disadvantage (Das et al., 1998). The other partner firm may also be much more dependent on the alliance and can capture higher returns should the alliance be successful and suffer from a bigger downside should the alliance fail. Given the potential disadvantages, Chan et al. (1997) argue that a key determinant for the success of a strategic alliance is the mutual trust between the partner firms and the prospect for continued co-operation between them beyond the scope of the current agreement.

3. Construction of hypotheses

The next section will construct the hypotheses of my study by reviewing the findings of prior literature. The first goal of my study is to examine whether business alliances in the Nordic countries, more specifically joint ventures and strategic alliances, generate abnormal returns during the announcement period. Other hypotheses are concerned with the characteristics of a successful business alliance. These characteristics involve the size of the firm, the internationality of the partner and of the business alliance, the relatedness of the partners and of the business alliances, and the effect of high technology.

3.1 General market reaction to all business alliance announcements

Perhaps the first event study with stock return data regarding business alliances conducted by McConnell and Nantell (1985) suggests that domestic joint ventures in the U.S. are wealth-creating intercorporate transactions for the shareholders of the participating companies. Their results suggest that the joint ventures generated two-day average abnormal returns of 0.73% in the sample years of 1972-1979 one day before the announcement date and on the announcement date [-1, 0]. The market model with a 120-day estimation period ending 61 days before the announcement date [-180, -61] was utilized to estimate the abnormal returns. The estimations were done using two-day returns. The results of McConnel and Nantell (1985) indicate that joint ventures generate strikingly similar abnormal returns compared with other types of corporate combinations which supports the synergy hypothesis of joint ventures. Evidence of this phenomenon is the fact that the dollar gains scaled by the amount of resources committed to the joint ventures lie in the range of premiums generated in intercorporate mergers and acquisitions. Furthermore, the smaller partner in a joint venture was shown to receive greater excess returns compared to the larger partner with the dollar gains being more equally divided. McConnell and Nantell (1985) recognize that it is possible that the announcements of joint ventures might sometimes reveal additional information about the announcing firms which might bias the abnormal effect allocated to the announcements. Therefore, they also tested their results with a "noncontaminated" sample which excluded other news and events from the companies and obtained nearly similar results implying that the abnormal returns from joint ventures are not driven by other firm-specific information released at the same time. However, their results could overestimate the effect of joint venture announcements as most of the uncertainty regarding negotiations has already been resolved by the announcement date. Furthermore, the authors also recognize that the companies in their sample were among the

largest U.S. corporations making it possible that the resources required, and the additional value created by their sample could be overstated compared to the average U.S. joint venture.

In their study of stock market reaction to strategic investment decisions, Woolridge and Snow (1990) find a 0.80% cumulative average abnormal return for joint ventures one day before the announcement and on the announcement date [-1, 0] in the U.S. during 1972-1987. They used a market-adjusted event study methodology where the abnormal return of a security is simply the difference in return compared to the market benchmark return. Their results indicated a very clear and strong relationship between strategic investment decisions and stock market valuation. Furthermore, the findings implicated that sharing assets with another firm generated the greatest returns considering strategic investment decisions. For instance, joint ventures which shared assets or resources generated the largest cumulative excess returns of 1.40% on the day before the announcement and on the announcement date [-1, 0]. Research and development joint ventures generated a 0.40% and asset construction joint ventures generated a 0.52% cumulative average abnormal return during the same two-day timeframe. The findings of Woolridge and Snow (1990) also indicated that early mover and fast follower strategies resulted in greater abnormal returns compared to defender strategies and that long-term strategic investment projects such as joint ventures created substantial value for shareholders in comparison to short-term investments. Furthermore, their results provided evidence that the stock market seems to reward managers who make well-conceived, long-term strategic decisions.

Lee and Wyatt (1990) examine international joint ventures of U.S. companies where the partner firms are foreign private enterprises. The authors report an approximate -0.52% negative cumulative average abnormal return during the three-day event window [-1, 1] around the announcement date [0]. Most of the negative abnormal returns occurred on the announcement date [0]. The length of the estimation window is not clearly specified in their study and they use an altered market model to account for cross-sectional dependence in the return estimations. Lee and Wyatt (1990) hypothesize that their negative return findings are likely due to bad corporate governance and managerial agency problems which result in overinvestment in expansion that simultaneously increases managerial control at the expense of shareholders. Interestingly, their findings suggest that U.S. firms that formed joint ventures in less developed countries generated the least negative abnormal returns. However, these results were not statistically significant.

Koh and Venkatraman (1991) report a two-day average abnormal return of 0.87% for joint ventures in the U.S. information technology sector one day before the announcement date and on the announcement date [-1, 0] during the sample years of 1972-1986. The market model with a 200-day estimation window ending 71 days before the announcement [-270, -71] was implemented in their research. The findings of Koh and Venkatraman (1991) suggest that joint ventures generally increase the market value of the parent firms and that they are superior compared to specific strategic alliances such as licensing, marketing, and supply agreements. Furthermore, their evidence suggests that firms forming joint ventures in identical industries generated superior abnormal returns compared to more unrelated industries and that smaller partners produced greater abnormal returns compared to larger partners. However, the differences were not tested for statistical significance.

Chung et al. (1993) find a negative cumulative average abnormal return of -0.35% for international joint ventures announced by U.S. firms during the three-day announcement period [-1, 1] in the sample years of 1969-1989. The findings suggest that shareholders suffer negative wealth effects from joint venture announcements. The negative abnormal returns mostly occur the day after the announcement date [1]. Their research utilized the market model with a 91-day event window [-60, 30]. The length of the estimation period is not clearly specified in the paper. Their results indicate that the negative abnormal returns begin as early as 47 days before the joint venture announcement suggesting that major leakages about the upcoming event are revealed significantly early. Furthermore, the cumulative average negative abnormal returns continue to decrease beyond the announcement date [0] indicating a lagged price adjustment which is contrary to the Efficient Market Hypothesis. The sub-sample generating the largest negative abnormal returns consists of international joint ventures with a foreign partner. The findings also provide weak evidence that international joint ventures in less developed countries generate greater negative abnormal returns which contradicts the findings of Lee and Wyatt (1990) where joint ventures in less developed countries generated the least negative abnormal returns. According to Chung et al. (1993), the type of industry does not seem to play a significant role for the abnormal returns. They argue that their findings of negative overall abnormal returns are most likely due to changes in general rationale to form international joint ventures. Furthermore, they hypothesize that managerial hubris, being overly optimistic and signalling theory may play a part in the results. Shareholders may take the announcement of an

international joint venture as evidence that a firm needs to form a joint venture to improve its prior poor performance resulting in a negative market reaction.

Chan et al. (1997) find positive abnormal returns of 0.64% for strategic alliances on the announcement date [0] and roughly 0.85% in the three-day announcement period [-1, 1] in the sample years of 1983-1992. They used the market model with an estimation period of 150 days [-170, -21]. Their evidence suggests that establishing strategic relationships creates significant value for the shareholders of the partnering firms. The findings also suggest that there is no leakage of information and that the full market reaction occurs on the announcement date. Chan et al. (1997) also compare the abnormal returns of the smaller and the larger partner and find that the smaller partners experience significantly greater abnormal returns from strategic alliances, but the dollar gains are approximately equal. Therefore, their findings are in line with McConnell and Nantell's (1985) research on joint ventures. Moreover, the evidence of Chan et al. (1997) suggests that high-tech firms experience more significant abnormal returns compared to low-tech firms supporting their flexibility and experimentation argument.

Park and Kim (1997) report positive cumulative average abnormal returns for joint ventures of U.S. firms around the event date, for instance 1.24% during the four-day event window [-2, 1] around the event date during 1979-1988. They used the market model with an approximately one-year estimation period [-264, -15]. Their study also provides proof that small firms gain significantly larger abnormal returns compared to large firms and that related partners generate greater abnormal returns compared to unrelated partners. Furthermore, joint ventures repeated between same partners are viewed more favourably by the market. A concluding remark is that the valuation effect of joint ventures is multifaceted and depends on the relationship between the partners, the nature of partners' contributions, the extent of partners' control over joint ventures, and the corporate governance in parent firms.

The results of Das et al. (1998) imply a cumulative average abnormal return of 0.40% in the three-day announcement period [-1, 1] during 1987-1991 for strategic alliances. The statistically significant cumulative abnormal returns mostly occur during the announcement date and the day after it [0, 1]. They used the market model with a 200-day estimation period ending 10 days before the announcement. Their evidence suggests that technology strategic alliances are more value creating than marketing alliances which is in line with the findings of

Koh and Venkatraman (1991). Das et al. (1998) theorize that the difference can be attributed to technological alliances' greater potential to generate more attractive future cash flows.

Merchant and Schendel (2000) report a cumulative average abnormal return of 0.70% for international joint ventures formed by U.S. firms with international partners in the manufacturing industry on the announcement date and the day after it [0, 1] during 1986-1990. Their results also suggest that firms forming joint ventures in related industries experience significant abnormal returns, but the relatedness of the partner is not of statistical significance. Experience on previous joint ventures and cultural differences don't play a significant role either and some evidence is found that forming joint ventures in low competition core business is not value creating. Moreover, Merchant and Schendel's (2000) results imply that forming joint ventures in highly competitive core businesses doesn't affect abnormal returns significantly.

Reuer and Koza's (2000) research on domestic and international joint ventures suggests a cumulative average abnormal return of 0.44% for joint ventures around the three-day announcement period [-1, 1] for their entire sample of 297 announcements. International joint ventures with unrelated industry partners, but with a related joint venture industry generated the largest cumulative average abnormal return of 0.62% and joint ventures with both related industry partners and related joint venture industries produced the most negative cumulative average abnormal return of -0.79 during the same event window [-1, 1]. Their results also imply that the stock market reacts positively to joint ventures formed under conditions of asymmetric information, that is, the more unrelated the partners are, the better abnormal returns for the venture.

Table 1 summarizes the general findings of notable previous literature concerning business alliances. Given that almost all prior studies suggest a positive stock market reaction to the announcements of business alliances, my first hypothesis is constructed as follows:

Hypothesis 1: The announcements of business alliances, more specifically joint ventures and strategic alliances, generate a positive cumulative average abnormal stock market return in the Nordic stock market.

Table 1: Summary of the findings of abnormal returns by prior literature

The below table illustrates the general findings and characteristics of notable previous literature concerning the cumulative average abnormal returns of business alliances.

Author(s)	Business alliance type	Stock return data source	Sample size	Sample years	Event window(s)[a]	CAAR[b]
McConnell and Nantell (1985)	Joint ventures (Domestic parents)	ISL (U.S. Stocks)	136 Announcements 210 Firms	1972-1979	[-1, 0]	0.73%
Lee and Wyatt (1990)	Joint ventures (International partners)	CRSP (U.S. Stocks)	109 Firms	1974-1986	[-1, 1]	-0.52%
Woolridge and Snow (1990)	Joint ventures	CRSP (U.S. Stocks)	197 Announcements	1972-1987	[-1, 0]	0.80%
Koh and Venkatraman (1991)	Joint ventures (IT sector)	CRSP (U.S. Stocks)	175 Announcements 239 Firms	1972-1986	[-1, 1]	0.87%
Chung et al. (1993)	Joint ventures (International partners)	CRSP (U.S. Stocks)	230 Announcements 173 Firms	1969-1989	[-1, 1]	-0.35%
Chan et al. (1997)	Strategic alliances	CRSP (U.S. Stocks)	345 Announcements 460 Firms	1983-1992	[-1, 1]	0.85%
Park and Kim (1997)	Joint ventures (Electronics industry)	CRSP (U.S. Stocks)	158 Announcements 174 Firms	1979-1988	[-2, 1]	1.24%
Das et al. (1998)	Strategic alliances	CRSP (U.S. Stocks)	119 Announcements	1987-1991	[-1, 1]	0.40%
Merchant and Schendel (2000)	Joint ventures (International) (Manufacturing industry)	CRSP (U.S. Stocks)	393 Announcements	1986-1990	[0, 1]	0.70%
Reuer and Koza (2000)	Joint ventures (Domestic and international)	CRSP (U.S. Stocks)	297 Announcements	1985-1995	[-1, 1]	0.44%

[a] The studies often have multiple event windows, the event window in the proximity of the announcement date [0] is demonstrated, if possible.

[b] The cumulative average abnormal returns described above are the general results of the respective studies and are shown to give an overview of the market impact of business alliances. All results shown have been obtained with event study methodology. The exact form of the event study methodology used in each study may differ and the results can't be directly compared with each other as such. Furthermore, the numbers described above are subject to change within the respective studies in case the authors exercise additional filters or methods to further test their results.

3.2 Joint venture premium over strategic alliances

Some previous literature implies that joint ventures should generate greater returns compared to strategic alliances. Joint ventures create a new legal entity as well as certain equity ties between the partner firms. As suggested by Stuart et al. (1999) these equity ties may signal greater commitment and confidence in the partnership. Combining partnership and ownership, as is the case in joint ventures, is also useful in managing contractual inefficiencies more effectively as it's almost never possible to contractually specify all terms in a strategic alliance. Furthermore, when both partners have an equity stake in the partnership, they are more likely to refrain from opportunistic behaviour. There exists little evidence for a possible joint venture premium over strategic alliances. Koh and Venkatraman's (1991) results suggest that joint ventures are superior to certain types of strategic alliances such as licensing, marketing, and supply agreements. However, joint ventures were not proven to be superior to technology exchanges, which are certain types of strategic alliances. Allen and Phillips' (2000) findings suggest that abnormal returns for strategic alliances are greater when an equity stake is involved. As joint ventures always contain an equity stake, the finding might hold for them as well.

The evidence suggesting a joint venture premium is scarce and the two types are not often compared. Furthermore, looking back at Table 1 of previous research's findings, there doesn't seem to be significant differences between the general abnormal returns of joint ventures and strategic alliances. Therefore, my second hypothesis is as follows:

Hypothesis 2: There is no significant difference between the cumulative average abnormal stock market returns of joint ventures and strategic alliances in the Nordic stock market.

3.3 Small firm premium

McConnell and Nantell's (1985) results indicate that the smaller partner gains larger excess returns but the dollar gains are more equally distributed. Therefore, it can be argued that relative size in joint ventures serves as a proxy for the acquiring and acquired firms in mergers and acquisitions. In fact, sometimes business alliances evolve into mergers and acquisitions over time (Mody, 1993). Park and Kim (1997) also find support for the small firm premium and go as far as to say that partner size is a critical variable affecting wealth gains from joint ventures and that joint ventures have different strategic and managerial implications for different partners

depending on their size. Particularly the smaller partners in joint ventures are regarded as risky investments by the stock market as their expertise may be exploited by the larger partner. Moreover, the degree of control in the joint venture may be limited for the smaller partner. Therefore, having enough equity share in the joint venture is regarded as an important corporate governance mechanism when forming joint ventures.

McConnell and Nantell (1985) tested the small firm premium hypothesis by isolating joint venture announcements. Their results report that the smaller firms generate an average two-day announcement period [-1, 0] excess return of 1.10% and larger firms generate a 0.63% excess return. Both results were statistically significant. However, the excess returns in dollar values were somewhat greater for the larger firms, roughly $6.65 million compared to the approximate $4.54 million of smaller firms. Koh and Venkatraman's (1991) findings also imply that both smaller and larger firms generate positive two-day announcement period [-1, 0] returns, 1.13% for the smaller partner and 0.44% for the larger partner. However, only the smaller partner produced statistically significant abnormal returns. Furthermore, the dollar value for the smaller partner was $19.2 million for the smaller firm compared to only $2.3 for the larger partner which is inconsistent with the relative size hypothesis suggested by McConnell and Nantell (1985). The findings of Park and Kim (1997) are also in line with the small firm premium as they report a significant 1.92% four-day cumulative abnormal return for smaller firms engaging in joint ventures around the announcement date [-2, 1]. Chan et al. (1997) repeated the procedure for strategic alliances and received results supporting the small firm premium. Smaller firms obtained a significant 2.22% average abnormal return on the announcement date compared to the larger firm's average of 0.19% which was insignificant. The results are also supportive of McConnell and Nantell's (1985) relative size hypothesis as the dollar gains for smaller partners were $8.9 million and for larger partners $8.1 million.

The small firm premium is well documented in previous literature regarding business alliances. Therefore, my third hypothesis is as follows:

Hypothesis 3: The announcements of business alliances generate greater cumulative average abnormal stock market returns for smaller firms compared to larger firms in the Nordic stock market.

3.4 International and domestic business alliances

Both domestic and international joint ventures face various sources of uncertainty. The uncertainties are magnified in an international setting due to economic, social and cultural differences. Tong et al. (2008) examined international joint ventures and argued that their ownership structure, product-market focus, and geographic location are important drivers affecting the value of the embedded growth options, but only under certain circumstances. Their findings propose that especially minority stake international joint ventures and diversifying international joint ventures contribute to the growth option value. International joint ventures can be an attractive entry vehicle for foreign markets since they offer the opportunity to share risk and the possibility to rely upon local partners' resources and knowledge. They also enable firms to access upside opportunities by expanding sequentially as new information on key sources of uncertainty becomes available (Tong et al., 2008). Furthermore, international joint ventures may be an excellent mechanism to diversify a firm's portfolio of investments. In an ideal situation, a firm forming an international joint venture captures effective scale economies through expansion, obtains crucial local know-how, benefits from cheaper research and development costs of new technology, and reduces entry barriers to target markets through increased knowledge of political and economic risks (Lee and Wyatt, 1990). International business alliances may also be viewed as value destroying. As suggested by Jensen's (1986) notion of agency costs of free cash flow, managers may opt to dispose any available extra cash to unproductive investments for private benefits and increased managerial control. This investing of free cash flows to diversify is also a common explanation for poor performance in the field of mergers and acquisitions. For instance, some of the worst performing acquisitions in the past have involved investing of free cash flows to diversify into unrelated industries (Shleifer and Vishny, 1991). Another possible explanation for the poor performance related to international joint ventures arises from signalling theory, both Lee and Wyatt (1990) and Chung et al. (1993) mention that shareholders may interpret the announcement of an international joint venture as evidence that a company is forming it to improve its poor performance. Thus, the announcement may reveal new unfavourable information about the company.

There exists mixed evidence on the abnormal returns of international business alliances. Reuer and Koza's (2000) results imply that both domestic and international joint ventures generate positive cumulative average abnormal returns during the three days around the announcement date [-1, 1], the cumulative average abnormal return for domestic joint ventures is 0.66% and

for international joint ventures the cumulative average abnormal return amounts to 0.18%, indicating that domestic joint ventures generate overall better returns compared to their international counterparts. The internationality in Reuer and Koza's (2000) study was measured with the location of the joint venture. The findings of Lee and Wyatt (1990) and Chung et al. (1993) suggest that joint ventures with an international partner generate negative abnormal returns. Lee and Wyatt (1990) report a negative cumulative average abnormal return of -0.52% and Chung et al. (1993) report a negative cumulative average abnormal return of -0.35% during the three-day announcement period [-1, 1]. Both papers suggested that managerial hubris and signalling are likely to be the key reasons behind the negative abnormal returns.

The evidence provided by previous literature regarding domestic and international business alliances mostly suggests that alliances with domestic partners outperform alliances with international partners. However, there exists less evidence on the impact of the business alliance's location. Furthermore, the degree of measuring internationality is multifaceted. Thus, my next hypotheses consider both the internationality of the partner and of the business alliance:

Hypothesis 4a: Announcements of business alliances with a domestic partner generate greater cumulative abnormal average stock market returns compared to announcements with an international partner in the Nordic stock market.
Hypothesis 4b: There is no significant difference between announcing a business alliance located domestically compared to announcing one located internationally regarding cumulative average abnormal stock market returns in the Nordic stock market.

3.5 Related and unrelated business alliances

The potential benefits and costs of diversification have been well documented in previous literature. Several reasons as to why diversifying may be profitable include managerial economies of scale, increased debt capacity, efficient resource allocation through internal capital markets, internalization of market failures, and reduction of the adverse selection problem (Campa and Kedia, 2002). In corporate finance literature, there exists evidence both for and against the assumption that diversifying destroys value. The debate is focused around a "diversification discount" and its existence. For instance, Berger and Ofek's (1995) and Comment and Jarrell's (1995) findings imply that diversified firms trade at a discount whereas other studies including Campa and Kedia's (2002) research suggest the diversification discount

is only the product of sample selection bias in the methodology (Villalonga, 2004). Theoretical framework specifically behind the positive abnormal returns of joint venture announcements includes suggestions that combining resources in a related manner creates more value than combining them in an unrelated manner. This view is generally named the "relatedness hypothesis". The underlying idea of the relatedness hypothesis is that companies can exploit their core competencies when operating in a set of related businesses and as a result, related non-diversifying joint ventures may create more value than unrelated diversifying ones since opportunities for value creation are maximized when joint ventures are closely related to their parent firms in terms of product and market scope (Koh and Venkatraman, 1991). Regarding strategic alliances, Chan et al. (1997) argue that there are two reasons why related non-diversifying strategic alliances may provide value. First, the strategic alliance can create value as a result of pooling complementary skills and technical linkages. Second, the strategic alliance can enhance the firm's market power in its own product market scope similarly to joint ventures.

The evidence of Koh and Venkatraman (1991) in the IT sector suggests that firms forming joint ventures in identical industries generate the largest cumulative average abnormal returns of 1.32% during the two-day announcement period [-1, 0]. The less related industries also generate positive average abnormal returns, but they are not statistically significant. The findings of Chan et al. (1997) imply that firms forming strategic alliances both in the same and different industries produce positive abnormal average returns on the announcement date [0]. The positive effect is the largest in high-tech alliances within the same industry which generated a 3.54% average abnormal return on the announcement date [0]. The average abnormal return of 1.45% for non-technical alliances in different industries was also found to be statistically significant. Merchant and Schendel's (2000) findings imply that related international joint ventures generate statistically significant returns, but the relatedness of the business partner is not statistically important.

There also exists some evidence that unrelated business alliances obtain better returns than related business alliances. These findings are often explained with the fact that firms may prefer business alliances when significant asymmetric information problems exist between the parent firms or between the firms' industries and the target industry of the business alliance. Balakrishnan and Koza's (1993) research on 64 U.S. domestic joint ventures suggested that value creation was the highest when the partners' businesses were dissimilar which opposed their findings on mergers and acquisitions where similarity was beneficial. However, their

sample size is relatively small, and they use monthly stock return data which is subject to be biased due to extraneous events unrelated to the forming of joint ventures. Reuer and Koza's (2000) findings suggest that international joint ventures created with an unrelated partner but within a related industry produced higher returns than other combinations, the cumulative average abnormal return for the combination was 0.62% during the three-day announcement period [-1, 1]. For domestic joint ventures, Reuer and Koza's (2000) findings suggest positive cumulative abnormal returns for all other combinations of relatedness except for the one where both the partner and the joint venture were in the same industry. These fully related domestic joint ventures generated a negative -0.30% cumulative average abnormal return during the three-day announcement period [-1, 1]. The results of Reuer and Koza (2000) are only statistically significant for fully unrelated domestic joint ventures where both the partner and the joint venture are in an unrelated industry and for international joint ventures with an unrelated partner and a related joint venture. These forms of joint ventures generated three-day announcement period cumulative average abnormal returns of 0.65% and 0.62% respectively.

In summary, previous literature mostly suggests that forming business alliances in related industries generate the largest abnormal returns with opposite evidence being statistically insignificant. However, the effect of the relatedness of the business alliance partner is quite unclear with mixed evidence. Therefore, I construct my next two hypotheses as follows:

Hypothesis 5a: The relatedness of the partner's industry does not significantly affect the cumulative average abnormal stock market returns of the firm announcing a business alliance in the Nordic stock market.

Hypothesis 5b: Firms announcing a business alliance in a related industry generate greater cumulative average abnormal stock market returns compared to firms forming a business alliance in an unrelated industry in the Nordic stock market.

3.6 High-technology business alliances

In their research concerning strategic alliances, Das et al. (1998) argue that high technology industries are more likely to benefit from the alliances due to product complexity and high costs related to obtaining the needed technology if created individually. Firms entering technological strategic alliances usually have products in the early stages of their life cycles and stand to gain more potential growth compared to other strategic alliances such as marketing alliances which

are more common in mature industries. Strategic alliances may also be favorable in the high technology industry as the sector is difficult to correctly value, making traditional acquisitions subject to severe moral hazard problems due to information asymmetry. A technological alliance may also signal the market that the firm is entering a growth phase, evoking investor enthusiasm (Das et al., 1998). Chan et al. (1997), supported by Mody's (1993) theories on alliances, hypothesize that high technology firms benefit the most from the flexibility of strategic alliances as they are able to experiment in rapidly changing business environments with significant risks of uncertainty and failure already in the development stage of new technologies. Therefore, they expect that high growth potential firms in high-tech industries should contribute more value to a strategic alliance compared to more mature firms in low-tech industries.

The evidence of Chan et al. (1997) supports the high-tech premium as they find a significant average abnormal return of 1.12% for high-tech firms entering strategic alliances compared to the insignificant average of 0.10% for low-tech firms on the event day. The high-tech premium is the greatest when the partners belong to same three-digit SIC industry, amounting to 3.54% on average. Technical strategic alliances in diversifying industries also generate positive abnormal average returns of 0.27% but the effect is statistically insignificant. Koh and Venkatraman (1991) reported a 0.87% positive average two-day cumulative abnormal return for technology exchanges in the IT sector during the announcement day and one day prior to it. Their findings confirm that firms regard technology access as an important motive for co-operation. However, they recognize that their sample size of 102 technology exchanges is small and the effect could be due to some outlier observations. The findings of Das et al. (1998) are also in line with Chan et al. (1997) and Koh and Venkatraman (1991) as they report that technological strategic alliances generate more value as they find a 1.20% cumulative average abnormal return for technological strategic alliances during a three-day announcement period [-1, 1] which is significantly higher than the negative -0.10% reported for marketing alliances.

Previous literature strongly implies that high technology business alliances produce greater abnormal returns compared to other types of alliances. Thus, my last hypothesis is as follows:

Hypothesis 6: Firms announcing a business alliance in the high-technology industry generate greater cumulative average abnormal stock market returns compared to firms announcing a business alliance in a different industry in the Nordic stock market.

4. Data and sampling

Data regarding joint venture and strategic alliance announcements is obtained from Securities Data Company (SDC) Platinum™ which provides details on financial transactions. More specifically, SDC Platinum's sub-database of Joint Ventures and Alliances under Mergers & Acquisitions database is utilized for the research. The sample years are from 2000 to 2018. The data from SDC includes information on the type of the transaction as well as information on the respective partners' industries among other variables. The announcements are filtered to only include two firms from which at least one must be a public firm from a Nordic country. In case both firms are public Nordic firms, the announcement is regarded as two announcements, one for each participant. Further utilization of the SDC transaction data for my research purposes is explained later in the methodology section. After obtaining a list of all companies included in the sample, their respective daily return index data is retrieved from Thomson Reuters Datastream (DS) along with the daily market benchmark return index data for the sample years 2000-2018. For Sweden and Denmark, price index data is used due to limited return index data availability. Only companies from which return data is obtainable one year prior to the business alliance announcement date are included in the sample. Data regarding market values of the companies and specific financial data such as book-to-market ratios are also obtained from Datastream. Table 2 illustrates the general composition of the sample used to derive the abnormal returns. The full sample consists of 1264 business alliance announcements of which 424 are joint ventures and 840 are strategic alliances.

Table 2: Overview of the sample of business alliance announcements

The below table illustrates the general overview of the sample of business alliance announcements to derive to abnormal returns. The specific countries and their market indices, as well as the division between joint ventures and strategic alliances is also demonstrated.

Country	Market Index	DS Code	Joint Ventures	Strategic Alliances	All Alliances
Denmark	OMX Copenhagen price index	COSEASH (PI)	30	122	152
Finland	OMX Helsinki return index	HEXINDX (RI)	167	264	431
Norway	Oslo Exchange return index	OSLOASH (RI)	106	122	228
Sweden	OMX Stockholm price index	SWSEALI (PI)	121	332	453
Total			**424**	**840**	**1264**

To test the specific hypotheses constructed earlier, the data concerning business alliance announcements needs to be sorted into specific sub-samples accordingly. Testing Hypothesis 1

doesn't require sub-sampling as it is concerned with examining the general abnormal returns of business alliances. To test Hypothesis 2, the business alliances are divided into joint ventures and strategic alliances. This is straightforward as SDC Platinum has a flag to sort the business alliances. For Hypothesis 3, the announcing companies are divided into small, and large firms. This is implemented according to Nasdaq Nordic's guidelines: "Companies with a market value exceeding EUR 1 billion are in the group of "Large Cap", while companies with a market value smaller than EUR 150 million belong to "Small Cap". Companies with a market value between EUR 150 million and EUR 1 billion belong to the "Mid Cap" segment." Market value data for each company is acquired from Datastream. Swedish, Danish, and Norwegian krona market values are converted into euros with Datastream's currency conversion. Hypothesis 4a requires sorting the business alliance announcements into international and domestic announcements by examining the partner. When the two firms associated in the respective announcement are from the same country, the announcement is considered domestic. In other cases, the announcement is considered international. The countries of the parent firms are provided in the SDC Platinum database. Hypothesis 4b is concerned with the location of the business alliance. The alliance is considered completely international if both the partners and the business alliance are located in different countries. Otherwise, it is considered at least partly domestic.

Hypotheses 5a and 5b examine the relatedness of the partners and of the business alliance. I will follow the methodology of previous literature (Balakrishan and Koza, 1993; Chan et al., 1997; Reuer and Koza, 2000) and sort the business alliances and their respective partners by their three-digit Standard Industrial Classification (SIC) codes which indicate specific industry groups. The SDC Platinum database provides the SIC codes for the parent firms and the business alliances. In case the parent firms or the business alliance have multiple SIC codes, the primary SIC code will be used. The partners will be considered related if their three-digit SIC codes match. The business alliance will be considered related if either or both the partners' primary three-digit SIC codes match with the primary three-digit SIC code of the business alliance. Finally, to test Hypothesis 6, the sample needs to be filtered to extract high-technology business alliances. To achieve this, I will utilize Kile and Phillips' (2009) guidelines of optimally benchmarking high-technology firms by their three-digit SIC codes. The benchmarking includes 11 unique three-digit SIC codes for high-technology industries. If a specific business alliance meets their benchmark list of unique three-digit SIC codes, it is considered a high-technology business alliance. Table 3 demonstrates the specific composition of the sample into different sub-samples.

Table 3: Sample composition into different sub-samples

The below table presents the descriptive sub-sampling of business alliance announcements. The filters are size (Panel A), partner relatedness by country (Panel B), business alliance relatedness by country (Panel C), partner relatedness by industry (Panel D), business alliance relatedness by industry (Panel D), and technology (Panel F).

Panel A: Sample composition by firm size

Firm size	Joint ventures	%	Strategic alliances	%	All alliances	%
Small cap	54	12.7%	187	22.3%	241	19.1%
Mid cap	95	22.4%	137	16.3%	232	18.4%
Large cap	275	64.9%	516	61.4%	791	62.6%
Total	424	100%	840	100%	1264	100%

Panel B: Sample composition by partner country

Partner International / Domestic	Joint ventures	%	Strategic alliances	%	All alliances	%
International	360	84.9%	756	90.0%	1116	88.3%
Domestic	64	15.1%	84	10.0%	148	11.7%
Total	424	100%	840	100%	1264	100%

Panel C: Sample composition by business alliance country

Partner International / Domestic	Joint ventures	%	Strategic alliances	%	All alliances	%
Alliance international to both partners	111	26.2%	481	57.3%	592	46.8%
Alliance domestic to one partner	261	61.6%	288	34.3%	549	43.4%
Alliance domestic to both partners	52	12.3%	71	8.5%	123	9.7%
Total	424	100%	840	100%	1264	100%

Panel D: Sample composition by partner industry relatedness (3-digit SIC codes)

Partner relatedness	Joint ventures	%	Strategic alliances	%	All alliances	%
Related	111	26.2%	280	33.3%	391	30.9%
Unrelated	313	73.8%	560	66.7%	873	69.1%
Total	424	100%	840	100%	1264	100%

Panel E: Sample composition by business alliance industry relatedness (3-digit SIC codes)

Alliance relatedness	Joint ventures	%	Strategic alliances	%	All alliances	%
Related	203	47.9%	347	41.3%	550	43.5%
Unrelated	221	52.1%	493	58.7%	714	56.5%
Total	424	100%	840	100%	1264	100%

Panel F: Sample composition by business alliance technology

High-tech / Other	Joint ventures	%	Strategic alliances	%	All alliances	%
High-tech	94	22.2%	417	49.6%	511	40.4%
Other	330	77.8%	423	50.4%	753	59.6%
Total	424	100%	840	100%	1264	100%

As is presented in Table 3: Panel A, most of the business alliance announcements are from large cap firms, which makes sense as they have more resources, investment opportunities, and excess cash. However, still a noticeable amount of roughly 19% of the announcements are from small cap firms. It is possible that small growth firms may be willing to take more risks and

therefore pursuing joint ventures and strategic alliances becomes more attractive. Another possible reason is the fact that bigger players are often interested in the unique technology possessed by small firms and wish to utilize or even exploit it, leading to the formation of business alliances with a small partner. Panel B demonstrates the distribution of domestic and international business alliance announcements by the location of the partner. The majority of the announcements concern a joint venture or a strategic alliance that is to be formed with a partner from a different country and only roughly 12% of the business alliances are formed with a domestic partner. The finding is logical as Nordic countries are relatively small. Thus, Nordic firms are likely to seek business partners across their own borders. Panel C shows the composition by business alliance country. Roughly 47% of the business alliances are formed in a country that is international to both partners illustrating that business alliances are often preferred in risky settings as was pointed out in the literature review section. This is especially true for strategic alliances as roughly 57% are formed in a foreign country for both partners.

Panel D describes the partner's industry relatedness when forming business alliances. It can be observed that most business alliances, roughly 69% are formed with an unrelated partner measured by the primary three-digit SIC code. However, as Panel E suggests, the business alliances themselves are more often related to at least one of the parent firms. Still, roughly 57% of the business alliances are formed in an industry unrelated to both parent firms measured by the primary three-digit SIC codes. The relative degree of unrelatedness and expansion to foreign markets could imply that firms prefer business alliances as a tool under uncertainty, as was suggested by existing literature discussed earlier in my study. Finally, Panel F shows that a relatively large amount of business alliances are of high technology in nature. This is especially true for strategic alliances of which nearly half are formed in a high-tech industry. For joint ventures, the proportion is only roughly 22%. Again, this observation supports the previous literature discussed earlier in the sense that business alliances with less obligations are preferred when exploring highly risky prospects such as new emerging technology.

5. Methodology

In an informationally efficient market, stock price responses to corporate announcements represent the market's evaluation of corporate decisions. To isolate the effect of a single announcement, the stock return of the announcing company needs to be adjusted for the expected return on the stock. The difference between actual and the expected return is called the abnormal return (Woolridge and Snow, 1990). Thus, event study methodology is implemented for every business alliance announcement to obtain the magnitude of the abnormal returns. Event study methodology can be traced back all the way to the 1930s (MacKinlay, 1997) and it was further popularized by Fama, Fisher, Jensen and Roll at the end of the 1960s (Sorokina et al., 2013). The methodology in my study largely follows the guidelines of MacKinlay (1997) who provides comprehensive instructions for modern event studies. In order to implement an event study, three different key factors must first be considered: frequency over which returns are measured, the length of the estimation period, and the event window used to measure the abnormal returns.

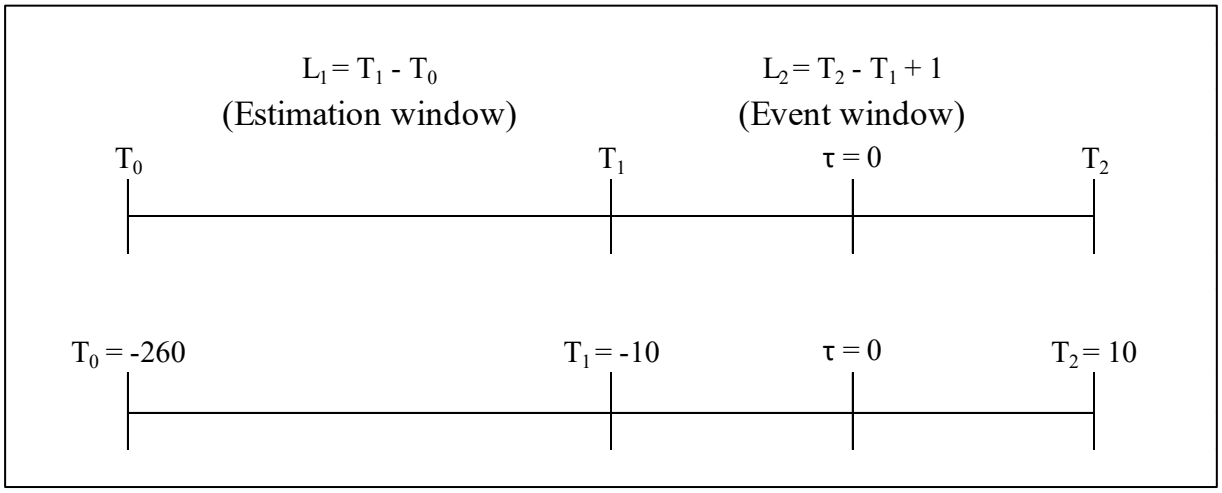
5.1 The estimation window and the event window(s)

All return data in the event study analysis is daily return data which is used almost exclusively in modern event studies (Sorokina et al., 2013). For instance, using monthly data could cause extraneous events to outweigh the effect of business alliance announcements (Koh and Venkatraman, 1991). There is no uniform agreement on the length of the estimation period. The lengths usually vary between 100 and 500 days (Sorokina et al., 2013). My study implements a 250-day trading day estimation period recommended by MacKinlay (1997). This time period is roughly equal to one calendar year. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. As for the event window, no general widely used framework exists. Excluding special cases, the event window in modern studies is usually within one week of the event announcement (Sorokina et al., 2013). I have decided to implement a 21-day period [-10, 10] as the maximum time period for the event window to also capture effects outside the immediate proximity of the announcement date [0]. I will also include different sub-windows within event window to add robustness to my findings. For instance, as is recommended by MacKinlay (1997), the three-day time period immediately around the announcement date [-1, 1] will be the main point of focus in my research. Previous literature has also often focused on the time period very close

to the event as is seen in Table 1 provided earlier while constructing the hypotheses. Figure 2 illustrates the estimation and the maximum event window of 21-days graphically.

Figure 2: The estimation window and the event window

The below figure demonstrates the formation of the estimation and event window. L_1 is the length of the estimation window (250 days), L_2 is the length of the event window (21 days), T_0 is the first day of the estimation period, T_1 is the first day of the event window, τ is the event date (announcement date), and T_2 is the last day of the event window. Defining the announcement day as day zero [0], the estimation period begins on day -260 and ends on day –11 [-260, -11]. The event window begins on day -10 and ends on day 10 [-10, 10]



5.2 Measuring the abnormal returns and their significance

Three different methods are used to estimate the coefficients which are obtained from the 250-day estimation period [-260, -11]. The first method to estimate the expected returns is the market model which can be traced back to Fama et al. (1969). According to Sorokina et al. (2013) the market model is the most utilized estimation method in modern event studies.

Market model estimation regression:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \varepsilon_{i,t}$$

where $r_{i,t}$ is the return of firm i on day t, $r_{m,t}$ is the benchmark market return on day t, α_i, and β_i are firm specific parameters, and ε_i is the firm specific error term.

Market model expected return:

$$E[r_{i,t}] = \hat{\alpha}_i + \hat{\beta}_i r_{m,t}$$

where $E[r_{i,t}]$ is the expected return of firm i on day t, $\hat{\alpha}_i$ is the estimated alpha of firm i, $\hat{\beta}_i$ is the estimated beta of firm i, $r_{m,t}$ is the market benchmark return on day t.

The second method implemented is the market-adjusted return model where the expected firm return is set to equal the market return. Therefore, no estimation regression is needed.

Market-adjusted model expected return:

$$E[r_{i,t}] = r_{m,t}$$

where $E[r_{i,t}]$ is the expected return of firm i on day t and $r_{m,t}$ is the benchmark market return on day t.

The third method used for estimation is the Dimson beta model which is a variation of the market model. It is used to correct the possible bias occurring from infrequent trading of small sized stocks and market direction bias (Dimson, 1979). The estimated beta coefficient in the Dimson beta model is the sum of lagged, current, and forward-looking beta estimates.

Dimson beta model estimation regression:

$$r_{i,t} = \alpha_i + \beta_{i1} r_{m,t-1} + \beta_{i2} r_{m,t} + \beta_{i3} r_{m,t+1} + \varepsilon_i$$

where $r_{i,t}$ is the return of firm i on day t, $r_{m,t-1}$, $r_{m,t}$, $r_{m,t+1}$ are the daily benchmark market returns on days t-1, t, and t+1, α_i, β_{i1}, β_{i2}, and β_{i3} are firm specific parameters, and ε_i is the firm specific error term.

Dimson beta model expected return:

$$E[r_{i,t}] = \hat{\alpha}_i + \hat{\beta}_i r_{m,t} \qquad \text{where}$$

$$\hat{\beta}_i = \hat{\beta}_{i1} + \hat{\beta}_{i2} + \hat{\beta}_{i3}$$

where $E[r_{i,t}]$ is the expected return of firm i on day t, $r_{m,t}$ is the benchmark market return on day t, $\hat{\alpha}_i$ is the estimated alpha of firm i, $\hat{\beta}_i$ is the estimated beta of firm i equal to the sum of the lagged, current, and forward-looking beta estimates, $\hat{\beta}_{i1}$, $\hat{\beta}_{i2}$, and $\hat{\beta}_{i3}$, respectively.

The daily abnormal returns are calculated after the estimated daily returns are obtained by using the three different estimation models described previously. The daily abnormal return is the difference between the observed return and the expected return.

Abnormal return:

$$AR_{i,t} = r_{i,t} - E[r_{i,t}]$$

where $AR_{i,t}$ is the abnormal return for firm i on day t, $r_{i,t}$ is the actual return of firm i on day t, and $E[r_{i,t}]$ is the expected return of firm i on day t.

The cumulative abnormal return is the sum of abnormal returns within the event window and the cumulative average abnormal return is their average.

Cumulative abnormal return and cumulative average abnormal return:

$$CAR_i(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} AR_{i,t}$$

$$CAAR(\tau_1, \tau_2) = \frac{1}{N} \sum_{t=\tau_1}^{\tau_2} CAR_i(\tau_1, \tau_2)$$

where $AR_{i,t}$ is the abnormal return for firm i on day t, $CAR_i(\tau_1, \tau_2)$ is the cumulative abnormal return of firm i from day τ_1 until day τ_2, and $CAAR(\tau_1, \tau_2)$ is the cumulative average abnormal return from a sample of N announcements from day τ_1 until day τ_2.

The traditional t-statistic is derived by using the cross-sectional approach as discussed by MacKinlay (1997). The method is used to remove the reliance on past returns in estimating the standard deviation of the cumulative abnormal returns. The cross-sectional t-statistic will be a reliable measure as event-date clustering is very minimal in my sample.

Test statistic for the cumulative average abnormal return:

$$t_{CAAR} = \sqrt{N} \frac{CAAR}{\sigma_{CAAR}} \qquad \text{where}$$

$$\sigma_{CAAR} = \sqrt{\frac{1}{N-1} \sum_{i=1}^{N} (CAR_i(\tau_1, \tau_2) - CAAR(\tau_1, \tau_2))^2}$$

where t_{CAAR} is the test statistic for the cumulative average abnormal return and σ_{CAAR} is its standard error from a sample of N announcements.

When comparing means of different samples, the Welch's t-test is utilized, and when comparing medians, Wilcoxon Signed-Rank Test is used, either paired or unpaired depending on the objective of the analysis. The test statistics for statistical significance are always obtained with statistical software to avoid manual errors. The statistical tables in my research will show the respective p-values for effective and consistent interpretation of results.

5.3 Multiple regression model for the abnormal returns

To further examine the implications of my hypotheses and to add statistical robustness to the findings, I will construct a multiple regression model to explain the abnormal returns. The multiple regression requires a dependent variable, control variables, and explanatory variables. Next, I will discuss the variables used in my analysis.

Dependent variable:

The dependent variable will be the cumulative abnormal return during the three-day announcement period [-1, 1] obtained by the previously described event-study methodology. Other event windows will also be examined for increased robustness.

Control variables:

Book-to-market ratio: The first control variable in the multiple regression analysis will be the book-to-market ratio of the associated firms. The use of the book-to-market ratio is motivated, for instance, by the findings of Fama and French (1991), who showed evidence that for individual stocks, the book-to-market ratio has an ability to explain cross-sectional variation in stock returns. Furthermore, various previous literature suggests that the book-to-market ratio can capture information about expected future returns due to its potential to proxy expected cash flows (Pontiff and Schall, 1998). The book-to-market ratio is obtained from Datastream.

Performance and risk: This control variable will be the firm's latest performance as previous literature, for instance Chung et al. (1993), has suggested that firms may form business alliances in response to subpar performance. The first control variable for performance will be the difference between the firm's last year's return compared to the market benchmark return. The second control variable for risk is the annualized volatility obtained from the daily returns of the estimation period. The return data is obtained from Datastream.

Types of agreements (dummy variables): Next control variables are concerned with the type of agreement regarding the business alliance. I will control for three types of agreements: research and development agreements, manufacturing agreements, and marketing agreements. The dummy variables will take the value 1 if the specific type criterion is met, and 0 otherwise. The data regarding the agreement types is obtained from SDC Platinum.

Private partner (dummy variable): Public firms face more obligations in disclosing sensitive information compared to private firms. Therefore, investors have increased information when both partners are publicly traded companies and may be able to make more informed investment decisions. The dummy variable will take the value 1 if the partner is a private company, 0 otherwise. Data regarding private partners is obtained from SDC platinum.

Explanatory variables:

The explanatory variables examine the implications of the hypotheses constructed earlier.

Joint venture (dummy variable): The dummy variable will take the value 1 if the announced business alliance is a joint venture, and the value 0 if the business alliance is a strategic alliance.

Market value(ln): The explanatory variable will be the natural logarithm of the market value of the announcing firm. The natural logarithm is used to reduce the potential skewness of the observations.

International partner (dummy variable): The dummy variable will take the value 1 if the partner firm of the business alliance announcement is located in a different country, 0 otherwise.

International business alliance (dummy variable): The dummy variable will take the value 1 if the business alliance is completely international by location, that is, both the partners and the business alliance are located in different countries, 0 otherwise.

Related partner (dummy variable): The dummy variable will take the value 1 if the partners' primary three-digit SIC codes match, 0 otherwise.

Related business alliance: The dummy variable will take the value 1 if one or both of the partners' primary three-digit SIC codes match with the primary three-digit SIC code of the business alliance, 0 otherwise.

High-technology business alliance: The dummy variable will take the value 1 if the business alliance's primary three-digit SIC code meets Kile and Philips' (2009) three-digit SIC code optimized criteria for a high-technology industry, 0 otherwise.

6. Results

The results section presents my findings on the cumulative average abnormal returns of business alliance announcements in the Nordic stock market during 2000 to 2018 to test the hypotheses constructed earlier in the paper. To revise, my study uses the term business alliance to refer to both joint ventures and strategic alliances. When comparing two different samples, the average of the three estimation models is utilized. This is warranted as all estimation models give similar estimation results. The models utilized are the market model, the market-adjusted model, and the Dimson beta model. The Appendix provides further details on the abnormal returns of a specific sub-sample by presenting the exact results from all three estimation models.

First, I begin by examining the general stock market effect of all business alliance announcements to test Hypothesis 1. Second, I will inspect whether joint venture announcements generate greater returns than strategic alliance announcements, as was suggested by Hypothesis 2. Third, I will examine the difference between the announcement effect of small and large firms to verify if a small firm premium exists as was implied by Hypothesis 3. Fourth, a closer look will be taken at domestic and international business alliance announcements to see if they produce a different effect. Hypothesis 4a suggested that business alliances with a domestic partner should generate greater abnormal returns and 5b suggested that the location of the business alliance itself is not significant considering the abnormal returns. Fifth, I will compare business alliance announcements made by partners in similar and different industries. More precisely, I will check whether the similarity of the industry of the partner and the announced business alliance have a significant effect on the abnormal returns. These analyses will explore the implications of Hypothesis 5a and 5b which implied that the relatedness of the partner should not matter for the abnormal returns and that related business alliances generate greater abnormal returns. Sixth, I will check if high-technology business alliance announcements generate greater abnormal returns compared to other alliances as implied by Hypothesis 6.

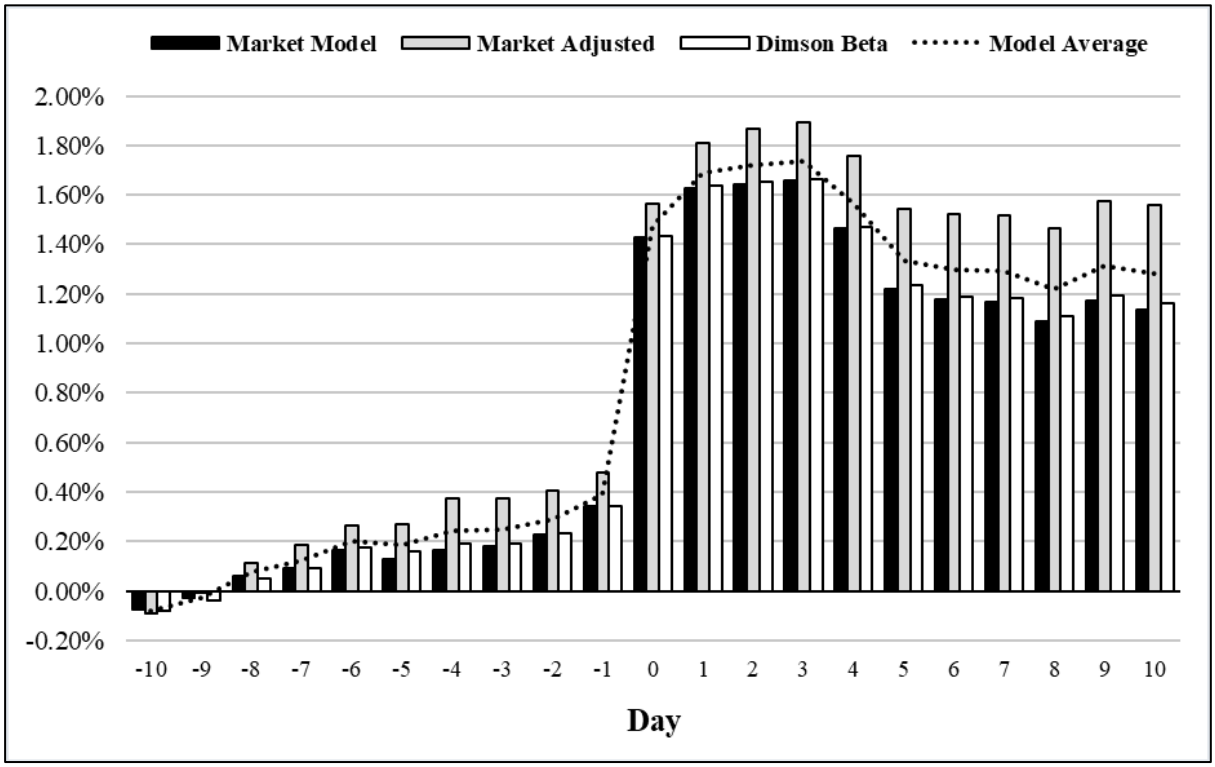
Finally, after the comparisons of different sub-samples, I will present the results of my multiple regression model to see if the coefficients of the explanatory variables are in line with my findings in the sub-sample comparison analysis. The dependent variable in the multiple regression model will be the cumulative abnormal return during different event windows.

6.1 Business alliance announcements

To test Hypothesis 1, the entire sample of business alliance announcements is examined. Figure 3 demonstrates the findings graphically. Table 4 illustrates the exact results and their statistical significance by using the average of all three estimation models and Table 5 gives further details on each respective estimation model used to derive the abnormal returns. The event windows have been divided into pre-event, event, and post-event timelines to improve the interpretation of my findings.

Figure 3: Stock market reaction to all business alliance announcements

The below figure presents the cumulative average abnormal returns (CAAR) for all business alliance announcements. The sample includes 1264 business alliance announcements during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The average of the estimation models is illustrated by the dotted line.



Looking at the results in Figure 3, and Table 4, there seems to exist positive pre-event cumulative average abnormal returns. However, these returns are not generally statistically significant. Only the market-adjusted model provides statistically significant proof in the ten-day period before the announcement in the event window [-10, 1]. In timeframes where the announcement date is included, statistically very significant cumulative average abnormal returns are always observed. For instance, the model average for the entire 21-day event

window [-10, 10] is 1.28% and for the three days surrounding the announcement [-1, 1] the positive model average effect amounts to 1.40%. Both numbers are statistically very significant. The medians also support the statistically significant average effect in timeframes including the announcement date [0]. During the post-event timeline, some statistically significant negative cumulative abnormal returns can be observed. The model average negative cumulative average abnormal return during the entire 10-day post event window [1, 10] is -0.19% and the median is -0.25%. The observed negative effect is most significant four and five days after the announcement date during the event window [4, 5] where the negative effect is measured to be -0.40% by the model average. The finding is supported by the median value of -0.19% which is also statistically very significant.

My findings imply a generally favorable reaction by the Nordic stock market in response to business alliance announcements. The results are also in line with previous literature strongly supporting Hypothesis 1 of positive cumulative average abnormal returns for business alliances. However, in contrast to previous research as demonstrated in Table 1 earlier in my paper, the cumulative average abnormal returns in the Nordic stock market during 2000-2018 seem to be somewhat higher in the immediate proximity of the announcement date, exceeding the 1% threshold not often observed earlier. Furthermore, the lagged price adjustment observed after the announcement is in line with the evidence of Chung et al. (1993) but contradicts the findings of Chan et al. (1997) whose results implied an immediate market response to the announcement. My results from the Nordic setting suggest that there may exist systematic overreactions to the announcements of business alliances at least to some extent, and that the markets tend to "correct" themselves a couple of days later. My results therefore imply a violation to the Efficient Market Hypothesis. A few possible explanations for this seemingly systematic phenomenon include investor overconfidence (Daniel et al., 1998), noise trader bias (Barber et al., 2009), and lack of effective arbitrage trading (Mitchell et al., 2002). There also seems to exist leakage of information before the business alliance announcements since there is an upward trend in cumulative average abnormal returns before the announcement. These pre-event and post-event trends, which seem to violate the Efficient Market Hypothesis, are easily observed in Figure 3 and are supported by all three estimation models in Table 5.

Table 4: Model average stock market reaction to all business alliance announcements

The below table presents the cumulative average abnormal returns (CAAR) of all business alliance announcements provided by the average of all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 1264 business alliance announcements in the Nordic stock market during 2000-2018.

All business alliances							
N = 1264	**Event window**	**Mean**	**p[a]**		**Median**	**p[b]**	
Pre-event	[-10, -5]	0.19%	(0.255)		0.11%	(0.281)	
	[-10, -1]	0.39%	(0.091)	*	0.20%	(0.463)	
	[-5, -1]	0.19%	(0.321)		-0.26%	(0.117)	
	[-3, -1]	0.15%	(0.371)		-0.15%	(0.228)	
	[-1]	0.10%	(0.283)		-0.04%	(0.270)	
Event	[-10, 10]	1.28%	(0.001)	***	0.19%	(0.090)	*
	[-5, 5]	1.13%	(0.000)	***	0.17%	(0.055)	*
	[-3, 3]	1.50%	(0.000)	***	0.25%	(0.000)	***
	[-1, 0]	1.19%	(0.000)	***	0.24%	(0.000)	***
	[-1, 1]	1.40%	(0.000)	***	0.22%	(0.000)	***
	[0]	1.09%	(0.000)	***	0.19%	(0.000)	***
	[0, 1]	1.30%	(0.000)	***	0.16%	(0.000)	***
Post-event	[1]	0.22%	(0.035)	**	-0.03%	(0.953)	
	[1, 3]	0.26%	(0.066)	*	-0.07%	(0.879)	
	[1, 5]	-0.14%	(0.375)		-0.24%	(0.016)	**
	[1, 10]	-0.19%	(0.377)		-0.25%	(0.038)	**
	[4, 5]	-0.40%	(0.000)	***	-0.19%	(0.002)	***
	[5, 10]	-0.28%	(0.111)		-0.15%	(0.014)	**

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 5: Model specific stock market reaction to all business alliance announcements

The below table presents the cumulative average abnormal returns (CAAR) of all business alliance announcements provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 1264 business alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 1264	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.13%	(0.434)	0.09%	(0.618)	0.27%	(0.111)	0.08%	(0.175)	0.16%	(0.333)	0.08%	(0.430)
	[-10, -1]	0.34%	(0.140)	0.01%	(0.678)	0.48%	(0.043) **	0.17%	(0.322)	0.34%	(0.138)	0.06%	(0.502)
Pre-event	[-5, -1]	0.18%	(0.351)	-0.27%	(0.113)	0.22%	(0.261)	-0.25%	(0.219)	0.17%	(0.377)	-0.21%	(0.130)
	[-3, -1]	0.18%	(0.272)	-0.14%	(0.361)	0.11%	(0.529)	-0.16%	(0.177)	0.15%	(0.348)	-0.10%	(0.349)
	[-1]	0.11%	(0.223)	-0.05%	(0.260)	0.08%	(0.432)	-0.03%	(0.365)	0.11%	(0.231)	-0.04%	(0.247)
	[-10, 10]	1.13%	(0.003) ***	0.11%	(0.340)	1.56%	(0.000) ***	0.69%	(0.004) ***	1.16%	(0.002) ***	0.00%	(0.261)
	[-5, 5]	1.06%	(0.000) ***	0.00%	(0.158)	1.28%	(0.000) ***	0.37%	(0.004) ***	1.06%	(0.000) ***	-0.02%	(0.137)
	[-3, 3]	1.49%	(0.000) ***	0.19%	(0.001) ***	1.52%	(0.000) ***	0.29%	(0.000) ***	1.48%	(0.000) ***	0.23%	(0.000) ***
Event	[-1, 0]	1.20%	(0.000) ***	0.26%	(0.000) ***	1.16%	(0.000) ***	0.24%	(0.000) ***	1.20%	(0.000) ***	0.27%	(0.000) ***
	[-1, 1]	1.40%	(0.000) ***	0.25%	(0.000) ***	1.40%	(0.000) ***	0.22%	(0.000) ***	1.40%	(0.000) ***	0.22%	(0.000) ***
	[0]	1.09%	(0.000) ***	0.14%	(0.000) ***	1.08%	(0.000) ***	0.21%	(0.000) ***	1.09%	(0.000) ***	0.15%	(0.000) ***
	[0, 1]	1.28%	(0.000) ***	0.14%	(0.000) ***	1.33%	(0.000) ***	0.24%	(0.000) ***	1.29%	(0.000) ***	0.18%	(0.000) ***
	[1]	0.20%	(0.054) *	-0.06%	(0.655)	0.24%	(0.020) **	-0.02%	(0.666)	0.21%	(0.046) **	-0.05%	(0.736)
	[1, 3]	0.23%	(0.113)	-0.12%	(0.420)	0.33%	(0.026) **	-0.03%	(0.404)	0.23%	(0.103)	-0.07%	(0.639)
Post-event	[1, 5]	-0.21%	(0.190)	-0.34%	(0.002) ***	-0.02%	(0.914)	-0.13%	(0.183)	-0.20%	(0.218)	-0.29%	(0.004) ***
	[1, 10]	-0.29%	(0.178)	-0.44%	(0.002) ***	-0.01%	(0.979)	-0.06%	(0.541)	-0.27%	(0.211)	-0.47%	(0.005) ***
	[4, 5]	-0.44%	(0.000) ***	-0.22%	(0.000) ***	-0.35%	(0.002) ***	-0.12%	(0.039) **	-0.43%	(0.000) ***	-0.21%	(0.000) ***
	[5, 10]	-0.33%	(0.062) *	-0.25%	(0.001) ***	-0.20%	(0.271)	-0.11%	(0.190)	-0.31%	(0.080) *	-0.31%	(0.002) ***

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

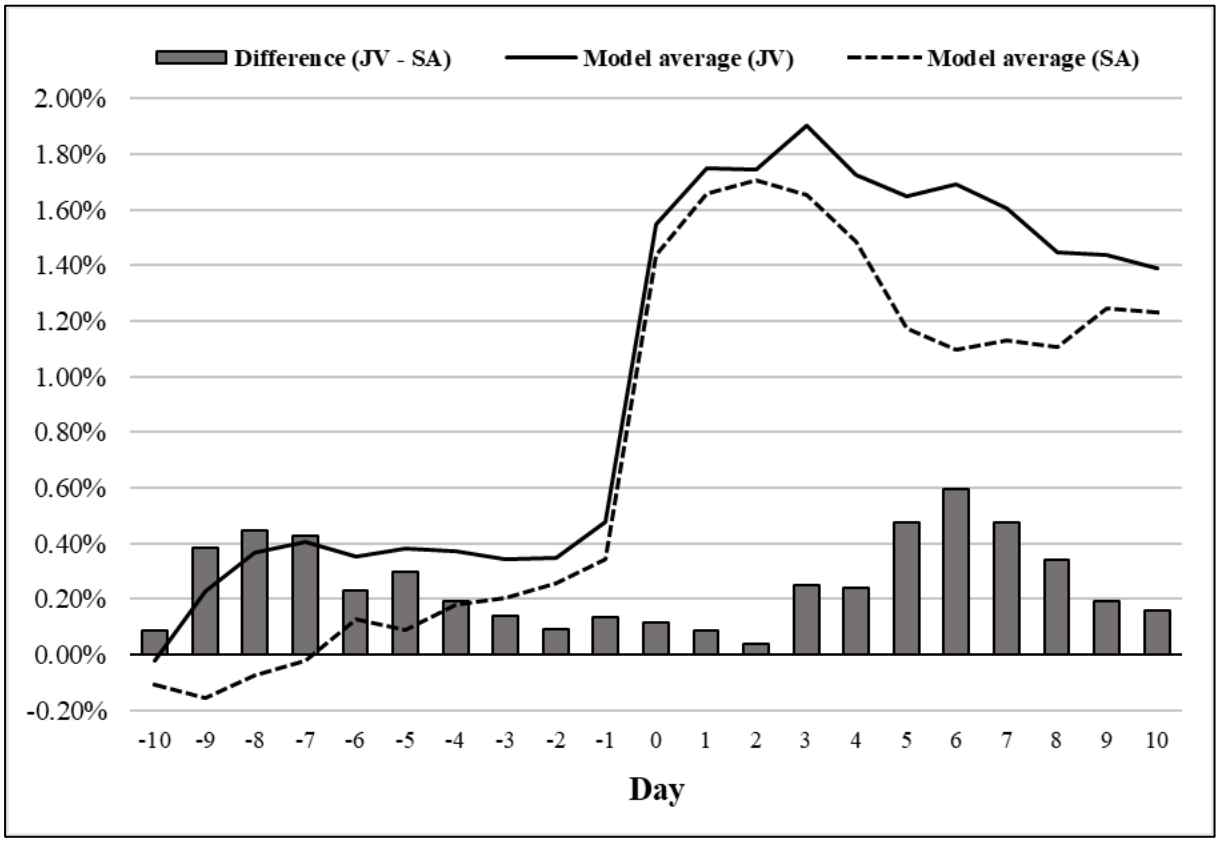
*** $p < .01$

6.2 Announcements of joint ventures and strategic alliances

Next, I will examine whether joint ventures generate greater abnormal returns compared to strategic alliances in the Nordic stock market. As discussed in the hypothesis construction, joint ventures include more mutual commitment and contractual bindings with certain equity ties between the partner firms which in turn could lead investors to view them more favourably compared to strategic alliances as suggested by Hypothesis 2. Figure 4 and Table 6, respectively, demonstrate the comparison between the cumulative abnormal returns of joint ventures and strategic alliances. The average of the three estimation models is used for the comparison as all the estimation models yield similar results. The exact results obtained by all three estimation results are provided in the Appendix: Table 15 for joint ventures, and Table 16 for strategic alliances.

Figure 4: Firms announcing joint ventures and strategic alliances

The below figure presents the comparison of cumulative average abnormal returns (CAAR) between firms announcing joint ventures (JV) and strategic alliances (SA). The sample includes 424 joint venture announcements and 840 strategic alliance announcements during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.



The results provided by the three estimation models imply that both joint ventures and strategic alliances experience roughly similar trends in the accumulation of cumulative average abnormal returns during the entire 21-day event window [-10, 10]. Moreover, both types of business alliances produce roughly equal abnormal returns in the immediate proximity to the announcement date. The main differences illustrated by Figure 4 and Table 6 occur in the pre-event and post-event timelines. There seems to be more information leakage associated with joint ventures five to ten days before the announcement [-10, -5]. However, the difference is only significant by observing the median value as is shown in Table 6. Another peculiar observation is that strategic alliances experience a more significant stock market "correction" in the post-event timeframe where they generate negative cumulative abnormal returns especially four and five days after the announcement date as is illustrated in Figure 4 and Table 6. During this timeframe, strategic alliances produce a negative -0.48% cumulative average abnormal return which is statistically very significant. However, the difference compared to joint ventures' negative cumulative average abnormal return is not statistically significant. Considering the entirety of my findings, I do not find enough evidence to support Hypothesis 2 which suggested that joint ventures generate greater abnormal returns than strategic alliances. In fact, the cumulative average abnormal returns of the two types of business alliance co-operation seem to be very similar, especially considering the entirety of the 21-day event window and the immediate proximity of the announcement date.

Table 6: Firms announcing joint ventures and strategic alliances

The below table presents the comparison between the cumulative average abnormal returns (CAAR) of firms announcing joint ventures and strategic alliances. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 424 joint venture announcements and 840 strategic alliance announcements in the Nordic stock market during 2000-2018.

		Joint ventures CAAR (N = 424)				*Strategic alliances CAAR (N = 840)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
Pre-event	[-10, -5]	0.38%	(0.196)	0.35%	(0.016) **	0.09%	(0.658)	-0.06%	(0.691)	0.30%	(0.402)	0.41%	(0.029) **
	[-10, -1]	0.48%	(0.281)	0.50%	(0.151)	0.34%	(0.194)	0.09%	(0.904)	0.13%	(0.798)	0.41%	(0.201)
	[-5, -1]	0.12%	(0.709)	-0.22%	(0.345)	0.22%	(0.340)	-0.28%	(0.221)	-0.10%	(0.812)	0.06%	(0.973)
	[-3, -1]	0.11%	(0.723)	-0.15%	(0.540)	0.17%	(0.391)	-0.15%	(0.300)	-0.06%	(0.868)	0.00%	(0.810)
	[-1]	0.13%	(0.289)	0.02%	(0.409)	0.09%	(0.495)	-0.12%	(0.064) *	0.04%	(0.815)	0.13%	(0.063) *
Event	[-10, 10]	1.39%	(0.037) **	0.63%	(0.121)	1.23%	(0.006) ***	0.06%	(0.322)	0.16%	(0.842)	0.57%	(0.507)
	[-5, 5]	1.30%	(0.013) **	0.37%	(0.095) *	1.05%	(0.004) ***	0.05%	(0.232)	0.25%	(0.697)	0.32%	(0.540)
	[-3, 3]	1.53%	(0.002) ***	0.63%	(0.005) ***	1.48%	(0.000) ***	0.06%	(0.011) **	0.06%	(0.926)	0.57%	(0.437)
	[-1, 0]	1.20%	(0.000) ***	0.40%	(0.000) ***	1.18%	(0.000) ***	0.16%	(0.000) ***	0.02%	(0.956)	0.23%	(0.247)
	[-1, 1]	1.40%	(0.001) ***	0.34%	(0.000) ***	1.40%	(0.000) ***	0.15%	(0.001) ***	0.00%	(0.995)	0.19%	(0.311)
	[0]	1.07%	(0.001) ***	0.24%	(0.000) ***	1.09%	(0.000) ***	0.16%	(0.000) ***	-0.02%	(0.961)	0.09%	(0.717)
	[0, 1]	1.27%	(0.002) ***	0.15%	(0.005) ***	1.32%	(0.000) ***	0.17%	(0.000) ***	-0.04%	(0.925)	-0.02%	(0.843)
Post-event	[1]	0.20%	(0.292)	-0.01%	(0.954)	0.22%	(0.065) *	-0.03%	(0.975)	-0.03%	(0.909)	0.02%	(0.985)
	[1, 3]	0.35%	(0.143)	0.09%	(0.473)	0.22%	(0.220)	-0.09%	(0.488)	0.13%	(0.654)	0.18%	(0.316)
	[1, 5]	0.10%	(0.693)	0.13%	(0.808)	-0.26%	(0.192)	-0.40%	(0.006) ***	0.36%	(0.263)	0.53%	(0.145)
	[1, 10]	-0.16%	(0.650)	0.05%	(0.497)	-0.21%	(0.449)	-0.39%	(0.038) **	0.05%	(0.918)	0.44%	(0.476)
	[4, 5]	-0.25%	(0.148)	-0.16%	(0.185)	-0.48%	(0.001) ***	-0.20%	(0.005) ***	0.23%	(0.310)	0.03%	(0.498)
	[5, 10]	-0.34%	(0.255)	-0.03%	(0.185)	-0.25%	(0.250)	-0.20%	(0.043) **	-0.08%	(0.823)	0.18%	(0.880)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

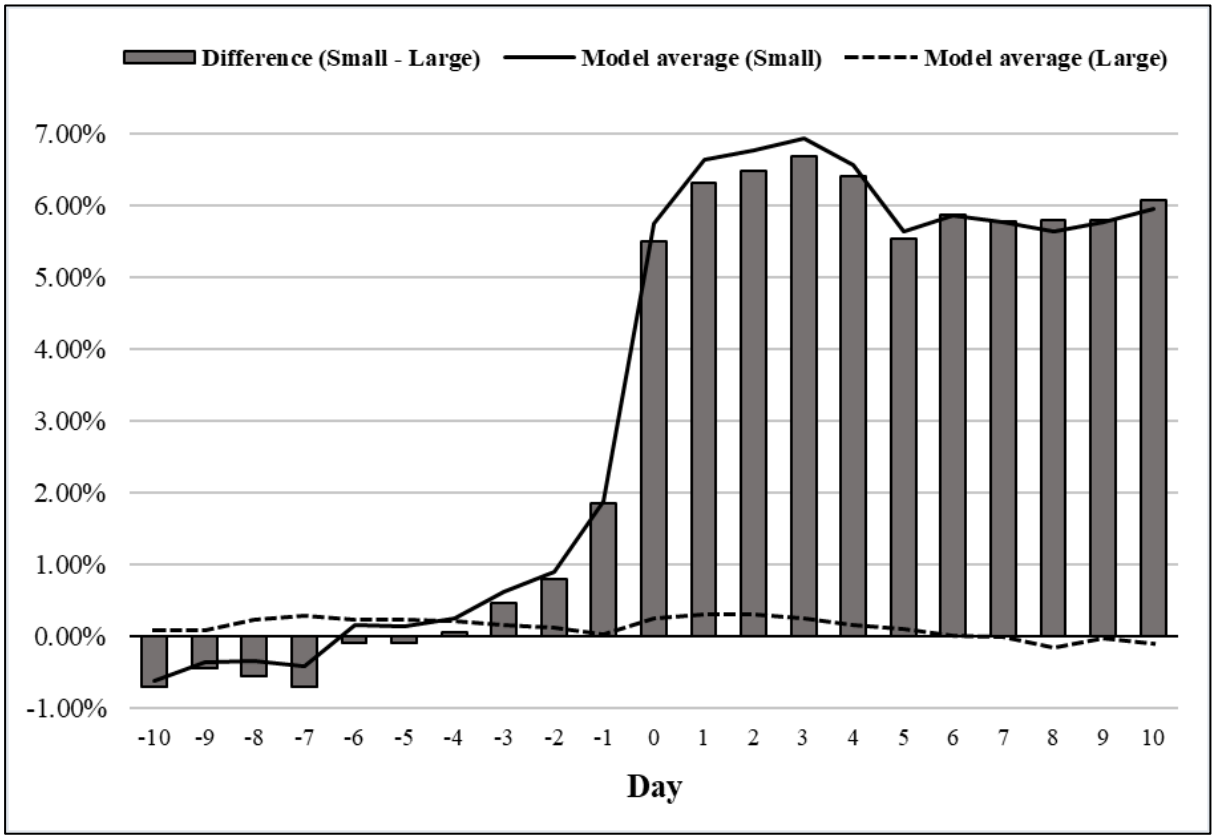
* $p < .10$
** $p < .05$
*** $p < .01$

6.3 Business alliance announcements by small cap and large cap firms

Previous literature has provided extensive evidence that smaller firms generate greater abnormal returns compared to larger firms as was discussed in the hypothesis construction section of my paper. However, the distribution of the monetary gains has been more unclear. To test Hypothesis 3 of a small firm premium, the sample is divided into small cap and large cap firms. Figure 5 and Table 7, respectively, demonstrate the comparison between the cumulative average abnormal returns of small and large cap companies announcing business alliances. Again, the average of the three estimation models is utilized. Table 17 and Table 18 in the Appendix provide further details on each respective model used to derive the abnormal returns.

Figure 5: Small cap and large cap firms announcing a business alliance

The below figure presents the comparison of cumulative average abnormal returns (CAAR) between small cap and large cap firms announcing a business alliance. The sub-samples include 241 announcements made by small cap firms and 791 announcements made by large cap firms during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.



Given the results shown in Figure 5 and Table 7, it is obvious that small firms generate excess abnormal returns compared to large firms. The effect is most prominent in the proximity of the announcement date. For instance, the mean difference between the average cumulative abnormal returns during the three-day announcement window [-1, 1] is 5.54% and for the entire event window [-10, 10] the difference is 6.07%. The results are statistically very significant. Moreover, the median values support the small firm premium effect as they also are all statistically very significant in every timeframe including the announcement date. Another interesting observation in the analysis is the fact that smaller firms seem to experience larger returns in anticipation of the announcement and a bigger adjustment to stock price post-event. For instance, in the 10-day period before the announcement [-10, -1], small firms generate a cumulative average abnormal return of 1.88% which is statistically significant. However, the median value during this timeframe is not statistically significant. The pre-event positive cumulative average abnormal returns thus seem to be driven by a relatively small number of firms experiencing considerable pre-announcement hype. The adjustment to the abnormal returns is also greater in the small cap sub-sample compared to large cap firms. Small cap firms experience a significant negative cumulative average abnormal return especially during the post-event timeframe of four to five days after the business alliance announcement [4, 5]. The negative effect during this specific event window is -1.30% which is significantly lower than the negative effect of -0.15% for large cap firms. Furthermore, the median values seem to imply that smaller firms continue to experience radical losses even after five to ten days after then announcement. For instance, the median negative cumulative average abnormal return five to ten days after the announcement [5, 10] is -1.30% for small cap firms.

Since the observed small firm premium in my results is so prevalent, I will examine the difference between mid-cap and large cap firms for increased robustness. Figure 6 and Table 8 demonstrate the comparison between the cumulative abnormal returns of mid- and large cap companies announcing business alliances. The average of the three estimation models is again utilized. Table 19 in the Appendix illustrates the exact results obtained by each respective model in order to derive the abnormal returns for the mid cap firms. The difference between mid-cap and large cap firms' cumulative average abnormal return in the three days around the announcement date [-1, 1] is 0.78% and statistically significant. For the entire event window [10, -10] the mean difference is 1.31%, which is also statistically significant. The median values also provide support for a significant difference in the proximity of the announcement date. Overall, the proof provided by examining both small cap and mid-cap firms compared to large

cap firms is supportive of the small firm premium as suggested by Hypothesis 3. The results also have some interesting implications. They are in line with previous literature, but the measured effect seems to be much higher. The differences may be explained by the methodology in sampling. Some studies look at the relative size of the partners, where a firm in considered small if it is the smaller of the two partner firms. This may lead some of the firms in the sample to be considered small even if they are relatively large by their market capitalization. Furthermore, my study takes the approach of considering a given firm small if its market value is below a threshold of 150 million euros, which may steer the results upward compared to prior studies with no fixed criteria.

Figure 6: Mid-cap and large cap firms announcing a business alliance

The below figure presents the comparison of cumulative average abnormal returns (CAAR) between mid-cap and large cap firms announcing a business alliance. The sub-samples include 232 announcements made by mid-cap firms and 791 announcements made by large cap firms during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.

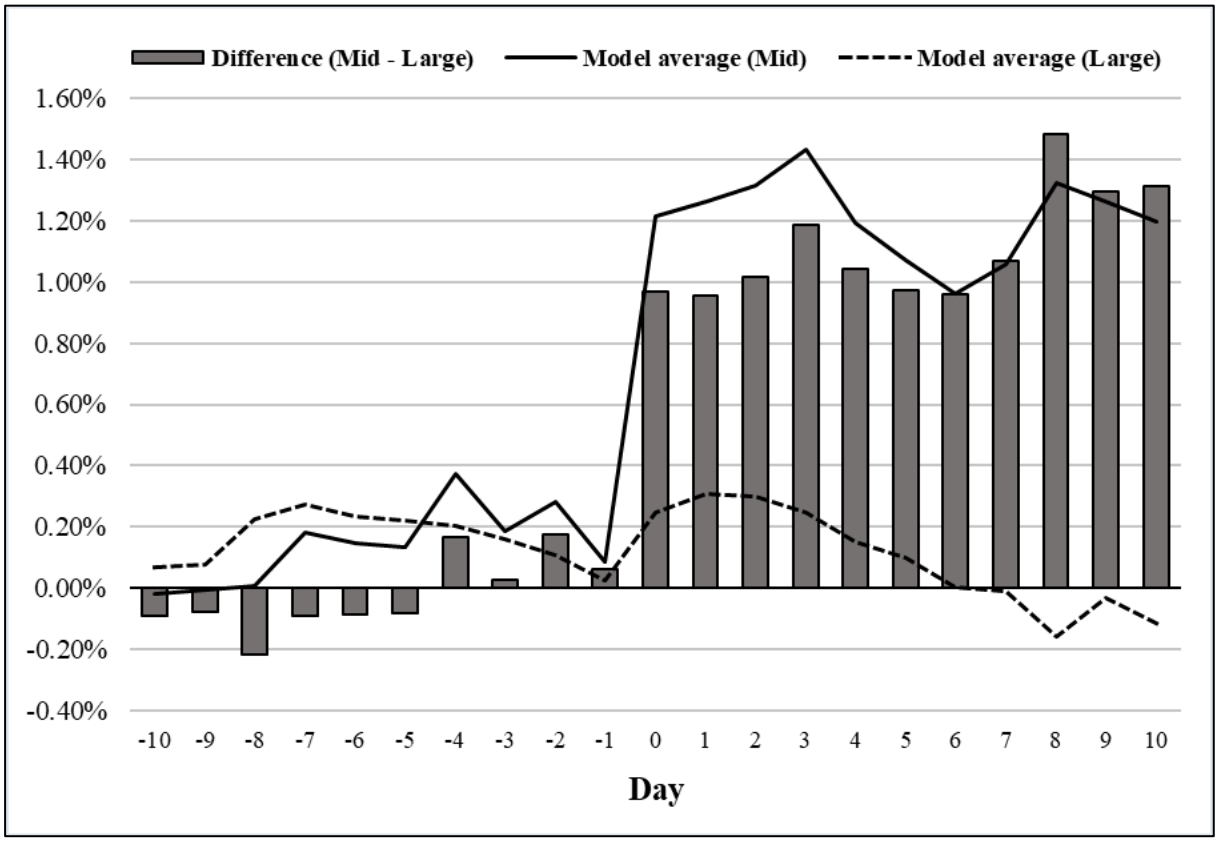


Table 7: Small and large cap firms announcing a business alliance

The below table presents the comparison between the cumulative abnormal average returns (CAAR) of small cap and large cap firms announcing a business alliance. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 241 announcements made by small cap firms and 791 announcements made by large cap firms in the Nordic stock market during 2000-2018.

		Small cap CAAR (N = 241)				*Large cap CAAR (N = 791)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
Pre-event	[-10, -5]	0.12%	(0.839)	-0.56%	(0.496)	0.22%	(0.134)	0.19%	(0.075) *	-0.10%	(0.880)	-0.75%	(0.082) *
	[-10, -1]	1.88%	(0.037) **	0.50%	(0.374)	0.02%	(0.905)	0.18%	(0.836)	1.86%	(0.045) **	0.33%	(0.691)
	[-5, -1]	1.74%	(0.027) **	-0.26%	(0.613)	-0.21%	(0.176)	-0.18%	(0.112)	1.95%	(0.015) **	-0.08%	(0.529)
	[-3, -1]	1.63%	(0.022) **	-0.04%	(0.194)	-0.18%	(0.145)	-0.11%	(0.120)	1.81%	(0.012) **	0.08%	(0.162)
	[-1]	0.98%	(0.020) **	0.01%	(0.122)	-0.08%	(0.168)	-0.03%	(0.152)	1.06%	(0.013) **	0.05%	(0.097) *
Event	[-10, 10]	5.96%	(0.000) ***	1.31%	(0.011) **	-0.11%	(0.697)	-0.07%	(0.689)	6.07%	(0.000) ***	1.38%	(0.014) **
	[-5, 5]	5.50%	(0.000) ***	1.77%	(0.000) ***	-0.14%	(0.541)	-0.25%	(0.478)	5.63%	(0.000) ***	2.02%	(0.000) ***
	[-3, 3]	6.69%	(0.000) ***	2.49%	(0.000) ***	0.04%	(0.822)	-0.10%	(0.785)	6.65%	(0.000) ***	2.59%	(0.000) ***
	[-1, 0]	4.85%	(0.000) ***	1.44%	(0.000) ***	0.14%	(0.108)	0.10%	(0.098) *	4.71%	(0.000) ***	1.35%	(0.000) ***
	[-1, 1]	5.74%	(0.000) ***	1.68%	(0.000) ***	0.20%	(0.087) *	0.10%	(0.111)	5.54%	(0.000) ***	1.58%	(0.000) ***
	[0]	3.87%	(0.000) ***	0.76%	(0.000) ***	0.22%	(0.003) ***	0.08%	(0.042) **	3.65%	(0.000) ***	0.67%	(0.000) ***
	[0, 1]	4.76%	(0.000) ***	0.99%	(0.000) ***	0.28%	(0.011) **	0.09%	(0.031) **	4.47%	(0.000) ***	0.90%	(0.000) ***
Post-event	[1]	0.89%	(0.029) **	0.07%	(0.162)	0.06%	(0.449)	-0.01%	(0.822)	0.83%	(0.046) **	0.08%	(0.302)
	[1, 3]	1.19%	(0.026) **	0.20%	(0.207)	0.00%	(0.982)	-0.08%	(0.593)	1.19%	(0.030) **	0.28%	(0.191)
	[1, 5]	-0.11%	(0.828)	-0.44%	(0.193)	-0.15%	(0.317)	-0.23%	(0.057) *	0.04%	(0.942)	-0.21%	(0.333)
	[1, 10]	0.21%	(0.779)	-0.54%	(0.309)	-0.36%	(0.089) *	-0.26%	(0.041) **	0.57%	(0.459)	-0.28%	(0.531)
	[4, 5]	-1.30%	(0.001) ***	-0.69%	(0.003) ***	-0.15%	(0.091) *	-0.13%	(0.085) *	-1.15%	(0.004) ***	-0.55%	(0.006) ***
	[5, 10]	-0.61%	(0.348)	-1.30%	(0.004) ***	-0.27%	(0.113)	0.00%	(0.240)	-0.34%	(0.609)	-1.30%	(0.003) ***

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

Table 8: Mid- and large cap firms announcing a business alliance

The below table presents the comparison between the cumulative abnormal average returns (CAAR) of mid-cap and large cap firms announcing a business alliance. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 232 announcements made by mid-cap firms and 791 announcements made by large cap firms in the Nordic stock market during 2000-2018.

		Mid-cap CAAR (N = 232)				*Large cap CAAR (N = 791)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
Pre-event	[-10, -5]	0.13%	(0.717)	0.29%	(0.553)	0.22%	(0.134)	0.19%	(0.075) *	-0.08%	(0.832)	0.10%	(0.963)
	[-10, -1]	0.09%	(0.854)	0.47%	(0.553)	0.02%	(0.905)	0.18%	(0.836)	0.06%	(0.904)	0.30%	(0.456)
	[-5, -1]	-0.06%	(0.853)	-0.77%	(0.330)	-0.21%	(0.176)	-0.18%	(0.112)	0.15%	(0.689)	-0.59%	(0.478)
	[-3, -1]	-0.29%	(0.260)	-0.41%	(0.223)	-0.18%	(0.145)	-0.11%	(0.120)	-0.11%	(0.705)	-0.30%	(0.509)
	[-1]	-0.20%	(0.206)	-0.20%	(0.125)	-0.08%	(0.168)	-0.03%	(0.152)	-0.11%	(0.489)	-0.17%	(0.285)
Event	[-10, 10]	1.20%	(0.091) *	0.74%	(0.052) *	-0.11%	(0.697)	-0.07%	(0.689)	1.31%	(0.087) *	0.81%	(0.044) **
	[-5, 5]	0.93%	(0.116)	0.40%	(0.123)	-0.14%	(0.541)	-0.25%	(0.478)	1.06%	(0.091) *	0.65%	(0.080) *
	[-3, 3]	1.06%	(0.024) **	0.44%	(0.107)	0.04%	(0.822)	-0.10%	(0.785)	1.02%	(0.043) **	0.54%	(0.201)
	[-1, 0]	0.93%	(0.000) ***	0.34%	(0.009) ***	0.14%	(0.108)	0.10%	(0.098) *	0.79%	(0.004) ***	0.24%	(0.089) *
	[-1, 1]	0.98%	(0.012) **	0.01%	(0.062) *	0.20%	(0.087) *	0.10%	(0.111)	0.78%	(0.057) *	-0.09%	(0.305)
	[0]	1.13%	(0.000) ***	0.28%	(0.000) ***	0.22%	(0.003) ***	0.08%	(0.042) **	0.91%	(0.000) ***	0.20%	(0.004) ***
	[0, 1]	1.18%	(0.002) ***	0.13%	(0.036) **	0.28%	(0.011) **	0.09%	(0.031) **	0.90%	(0.023) **	0.05%	(0.301)
Post-event	[1]	0.05%	(0.840)	-0.26%	(0.074) *	0.06%	(0.449)	-0.01%	(0.822)	-0.01%	(0.969)	-0.25%	(0.044) **
	[1, 3]	0.22%	(0.523)	-0.17%	(0.478)	0.00%	(0.982)	-0.08%	(0.593)	0.22%	(0.545)	-0.09%	(0.547)
	[1, 5]	-0.14%	(0.755)	-0.26%	(0.445)	-0.15%	(0.317)	-0.23%	(0.057) *	0.01%	(0.990)	-0.04%	(0.941)
	[1, 10]	-0.02%	(0.975)	0.15%	(0.920)	-0.36%	(0.089) *	-0.26%	(0.041) **	0.35%	(0.535)	0.41%	(0.321)
	[4, 5]	-0.36%	(0.262)	-0.18%	(0.512)	-0.15%	(0.091) *	-0.13%	(0.085) *	-0.21%	(0.519)	-0.04%	(0.835)
	[5, 10]	0.00%	(0.992)	0.05%	(0.846)	-0.27%	(0.113)	0.00%	(0.240)	0.27%	(0.523)	0.05%	(0.514)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

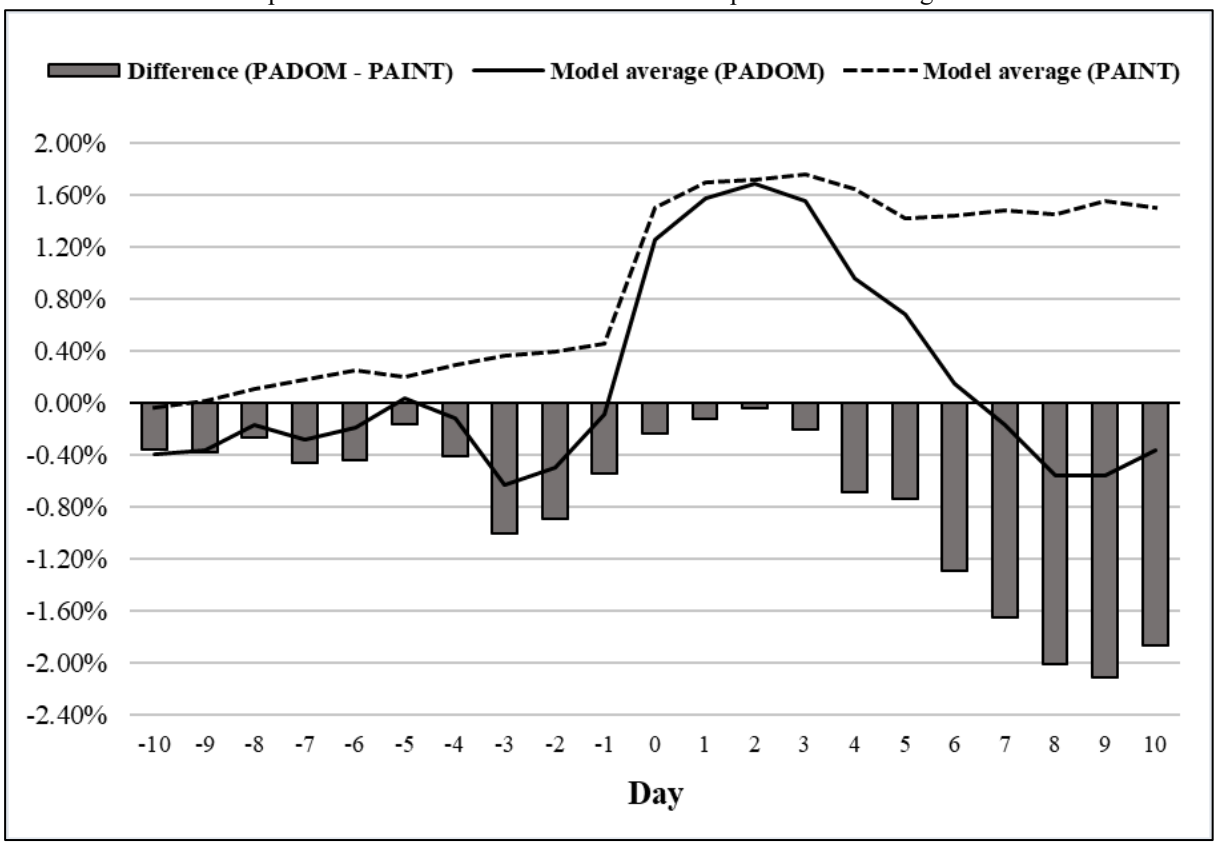
[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

6.4 Domestic and international business alliance announcements

Previous literature has shown mixed findings for domestic and international business alliances regarding their abnormal returns. To test Hypothesis 4a of a premium for domestic partners, the sample is first divided into international and domestic business alliance announcements by the partners' home countries. Figure 7 and Table 9, respectively, present the comparison between the cumulative average abnormal returns of business alliances with domestic and foreign partners. The average of the three estimation models is utilized for comparison. Table 20 and Table 21 in the Appendix provide further details on each respective estimation model used to derive the abnormal returns.

Figure 7: Firms announcing a business alliance with domestic and international partners
The below table presents the comparison between the cumulative abnormal average returns (CAAR) of firms announcing a business alliance with a domestic (PADOM) and an international partner (PAINT). The sub-samples include 148 business alliance announcements with a domestic partner and 1116 alliance announcements with a foreign partner during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.



The results show that business alliance announcements with both domestic and international partners generate positive cumulative average abnormal returns in the proximity of the

announcement date [0] where both types generate positive abnormal returns. For instance, business alliances with domestic partners produce on average 2.08% and alliances with international partners 1.31% positive cumulative average abnormal returns in the three-day announcement period [-1, 1]. However, in the entire 21-day event window, business alliances with a domestic partner show a negative -0.37% cumulative average abnormal return and business alliances with a foreign partner show a positive 1.50% abnormal return. Business alliances with a foreign partner seem to especially outperform alliances with domestic partners in the pre-event and post-event timelines. The differences are not statistically significant in the pre-event window but the negative effect is very prominent during the post-event timeframe of ten days after the announcement [1, 10] where the difference in the cumulative average abnormal returns of the announcements is -1.63% and statistically very significant. However, the difference of the medians does not support the finding. Furthermore, due to the small sample size and due to the fact that the negative cumulative average abnormal returns seem to occur after the announcement date, no decisive conclusion can be drawn on the apparent outperforming of business alliances with a foreign partner compared to domestic partners. Still, given the results, there is no support for Hypothesis 4a implying a premium for domestic partners as business alliances with domestic partners seem to rather underperform than outperform compared to business alliances with foreign partners. However, the sample size for domestic partners is very small with only 148 observations which may cause serious variability concerning the results due to possible extreme outlier observations.

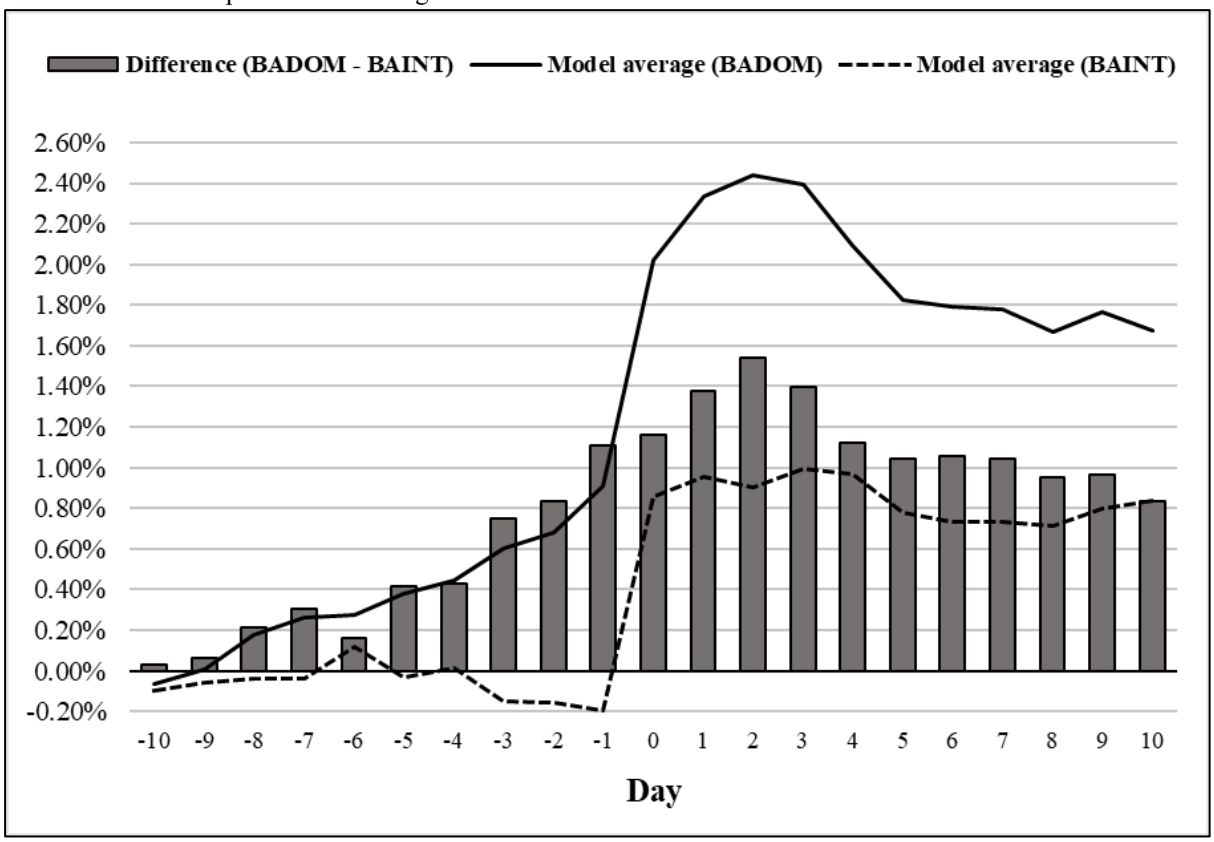
Next, I will examine the effect of internationality measured by the location of the business alliance to test Hypothesis 4b. The business alliance is considered purely international if both partners and the business alliance are located in different countries. Otherwise, the alliance is considered domestic as at least one of the partners is not expanding to new markets. Figure 8 and Table 10, respectively, present the comparison between the cumulative average abnormal returns of business alliances formed domestically in respect to at least one of the partners and those that are formed completely internationally. Table 22 and Table 23 in the Appendix provide further details on the respective estimation models used to derive the cumulative average abnormal returns.

The division of the sample into domestic and international business alliances gives different results this time around when internationality is defined in respect to the location of the alliance and not of the partner. In cases where either the firm, the partner, or both are announcing a

business alliance domestically the cumulative average abnormal returns seem to be greater. For instance, given the criteria, domestic business alliances generate a cumulative average abnormal return of 1.68% during the entire event window [-10, 10] and during the three-day announcement period [-1, 1] they produce a cumulative average return of 1.65%. The results for completely international business alliances are 0.84% in the entire 21-day event window [-10, 10] and 1.11% in the three-day announcement period [-1, 1]. Both types experience significant returns in timeframes including the announcement date [0] also supported by the median values. However, the differences between the groups are only statistically significant in pre-event timelines.

Figure 8: Firms announcing a business alliance domestically and internationally

The below table presents the comparison between the cumulative abnormal average returns (CAAR) of firms announcing a business alliance where either the firm or the partner, or both, are located in the same country as the respective alliance (BADOM) and firms announcing a business alliance where both the partners and the respective alliance are all located in a different country (BAINT). Given the criteria, the sub-samples include 672 domestic business alliance announcements and 592 international business alliance announcements during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.



The most significant difference happens during the timeline of five days before the business alliance announcement [-5, -1] where domestic business alliances outperform international ones by 0.94%. However, the median values do not support this significant difference between the groups in the pre-event timeline. Overall, given the results, it seems that domestic business alliances perform better than international ones but there is not enough evidence to support an argument that the effect is significant. Therefore, the evidence seems to be in favour of Hypothesis 4b of no significant differences between the groups.

In common with the findings of previous literature, my evidence on both international and domestic partners as well as international and domestic business alliances by the location of the alliance yielded mixed results. It seems domestic business alliances underperform when internationality is measured with the location of the partner but outperform when internationality is measured with the location of the business alliance. However, the differences in neither case are statistically significant to make any decisive conclusions.

Table 9: Firms announcing a business alliance with domestic and international partners

The below table presents the comparison between the cumulative abnormal average returns (CAAR) of firms announcing a business alliance with a domestic or an international partner. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 148 announcements with domestic partners and 1116 announcements with foreign partners in the Nordic stock market during 2000-2018.

		Domestic partner CAAR (N = 148)				*Foreign partner CAAR (N = 1116)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
Pre-event	[-10, -5]	0.04%	(0.926)	-0.04%	(0.803)	0.21%	(0.244)	0.12%	(0.288)	-0.17%	(0.713)	-0.17%	(0.914)
	[-10, -1]	-0.09%	(0.886)	-0.21%	(0.387)	0.45%	(0.067) *	0.27%	(0.260)	-0.54%	(0.419)	-0.48%	(0.190)
	[-5, -1]	0.10%	(0.851)	-0.71%	(0.085) *	0.20%	(0.324)	-0.18%	(0.302)	-0.10%	(0.870)	-0.53%	(0.176)
	[-3, -1]	0.03%	(0.953)	-0.53%	(0.170)	0.16%	(0.355)	-0.12%	(0.441)	-0.14%	(0.779)	-0.41%	(0.267)
	[-1]	0.41%	(0.139)	-0.04%	(0.888)	0.06%	(0.551)	-0.04%	(0.223)	0.35%	(0.233)	0.00%	(0.678)
Event	[-10, 10]	-0.37%	(0.723)	-0.54%	(0.412)	1.50%	(0.000) ***	0.26%	(0.036) **	-1.87%	(0.094) *	-0.81%	(0.155)
	[-5, 5]	0.88%	(0.359)	-0.37%	(0.495)	1.17%	(0.000) ***	0.23%	(0.022) **	-0.29%	(0.773)	-0.60%	(0.145)
	[-3, 3]	1.67%	(0.080) *	0.28%	(0.451)	1.47%	(0.000) ***	0.24%	(0.000) ***	0.20%	(0.841)	0.03%	(0.636)
	[-1, 0]	1.76%	(0.013) **	0.15%	(0.197)	1.11%	(0.000) ***	0.25%	(0.000) ***	0.65%	(0.369)	-0.10%	(0.675)
	[-1, 1]	2.08%	(0.018) **	-0.15%	(0.454)	1.31%	(0.000) ***	0.27%	(0.000) ***	0.77%	(0.393)	-0.42%	(0.385)
	[0]	1.35%	(0.031) **	0.05%	(0.306)	1.05%	(0.000) ***	0.22%	(0.000) ***	0.30%	(0.640)	-0.17%	(0.373)
	[0, 1]	1.67%	(0.036) **	-0.03%	(0.518)	1.25%	(0.000) ***	0.19%	(0.000) ***	0.42%	(0.610)	-0.22%	(0.249)
Post-event	[1]	0.32%	(0.383)	-0.04%	(0.651)	0.20%	(0.056) *	-0.02%	(0.917)	0.12%	(0.759)	-0.03%	(0.642)
	[1, 3]	0.29%	(0.500)	0.19%	(0.741)	0.26%	(0.087) *	-0.08%	(0.770)	0.03%	(0.941)	0.27%	(0.662)
	[1, 5]	-0.58%	(0.283)	-0.33%	(0.142)	-0.08%	(0.616)	-0.24%	(0.040) **	-0.50%	(0.378)	-0.09%	(0.486)
	[1, 10]	-1.63%	(0.011) **	-0.03%	(0.217)	0.00%	(0.998)	-0.32%	(0.077) *	-1.63%	(0.017) **	0.28%	(0.531)
	[4, 5]	-0.87%	(0.009) ***	-0.52%	(0.012) **	-0.34%	(0.003) ***	-0.15%	(0.021) **	-0.53%	(0.131)	-0.37%	(0.096) *
	[5, 10]	-1.33%	(0.010) ***	-0.27%	(0.084) *	-0.14%	(0.450)	-0.12%	(0.045) **	-1.19%	(0.030) **	-0.15%	(0.318)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 10: Firms announcing a business alliance domestically and internationally

The below table presents the comparison between the cumulative abnormal average returns (CAAR) of firms announcing a business alliance where either the firm or the partner, or both, are located in the same country as the respective alliance and firms announcing a business alliance where both the partners and the alliance are all located in a different country. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 672 domestic business alliance announcements and 592 international business alliance announcements in the Nordic stock market during 2000-2018.

		Dom. business alliance (N = 672)				*Int. business alliance CAAR (N = 592)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
	[-10, -5]	0.38%	(0.087) *	0.15%	(0.081) *	-0.03%	(0.886)	-0.04%	(0.730)	0.41%	(0.205)	0.20%	(0.155)
	[-10, -1]	0.91%	(0.008) ***	0.40%	(0.241)	-0.20%	(0.514)	0.03%	(0.848)	1.11%	(0.015) **	0.37%	(0.313)
Pre-event	[-5, -1]	0.63%	(0.033) **	-0.25%	(0.397)	-0.31%	(0.164)	-0.26%	(0.168)	0.94%	(0.011) **	0.01%	(0.746)
	[-3, -1]	0.46%	(0.072) *	-0.18%	(0.299)	-0.21%	(0.257)	-0.12%	(0.500)	0.68%	(0.034) **	-0.06%	(0.843)
	[-1]	0.23%	(0.139)	-0.02%	(0.673)	-0.04%	(0.662)	-0.09%	(0.235)	0.27%	(0.138)	0.07%	(0.605)
	[-10, 10]	1.68%	(0.003) ***	0.03%	(0.132)	0.84%	(0.070) *	0.26%	(0.346)	0.84%	(0.254)	-0.23%	(0.716)
	[-5, 5]	1.54%	(0.001) ***	0.15%	(0.202)	0.67%	(0.046) **	0.17%	(0.145)	0.88%	(0.130)	-0.02%	(0.858)
	[-3, 3]	1.95%	(0.000) ***	0.29%	(0.004) ***	0.98%	(0.001) ***	0.19%	(0.020) **	0.97%	(0.078) *	0.09%	(0.689)
Event	[-1, 0]	1.34%	(0.000) ***	0.23%	(0.000) ***	1.01%	(0.000) ***	0.25%	(0.000) ***	0.32%	(0.364)	-0.02%	(0.984)
	[-1, 1]	1.65%	(0.000) ***	0.22%	(0.000) ***	1.11%	(0.000) ***	0.23%	(0.001) ***	0.54%	(0.211)	-0.01%	(0.868)
	[0]	1.11%	(0.000) ***	0.18%	(0.000) ***	1.06%	(0.000) ***	0.22%	(0.000) ***	0.05%	(0.867)	-0.04%	(0.636)
	[0, 1]	1.43%	(0.000) ***	0.14%	(0.000) ***	1.16%	(0.000) ***	0.18%	(0.000) ***	0.27%	(0.499)	-0.04%	(0.934)
	[1]	0.32%	(0.043) **	0.05%	(0.443)	0.10%	(0.431)	-0.08%	(0.350)	0.22%	(0.281)	0.13%	(0.228)
	[1, 3]	0.38%	(0.064) *	0.07%	(0.372)	0.14%	(0.499)	-0.24%	(0.238)	0.24%	(0.402)	0.31%	(0.144)
Post-event	[1, 5]	-0.20%	(0.387)	-0.19%	(0.126)	-0.08%	(0.724)	-0.36%	(0.056) *	-0.12%	(0.706)	0.17%	(0.802)
	[1, 10]	-0.34%	(0.270)	-0.13%	(0.130)	-0.02%	(0.952)	-0.40%	(0.156)	-0.32%	(0.450)	0.27%	(0.942)
	[4, 5]	-0.57%	(0.001) ***	-0.28%	(0.002) ***	-0.21%	(0.135)	-0.12%	(0.267)	-0.36%	(0.099) *	-0.16%	(0.150)
	[5, 10]	-0.42%	(0.107)	-0.17%	(0.040) **	-0.13%	(0.590)	-0.13%	(0.175)	-0.29%	(0.413)	-0.04%	(0.630)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

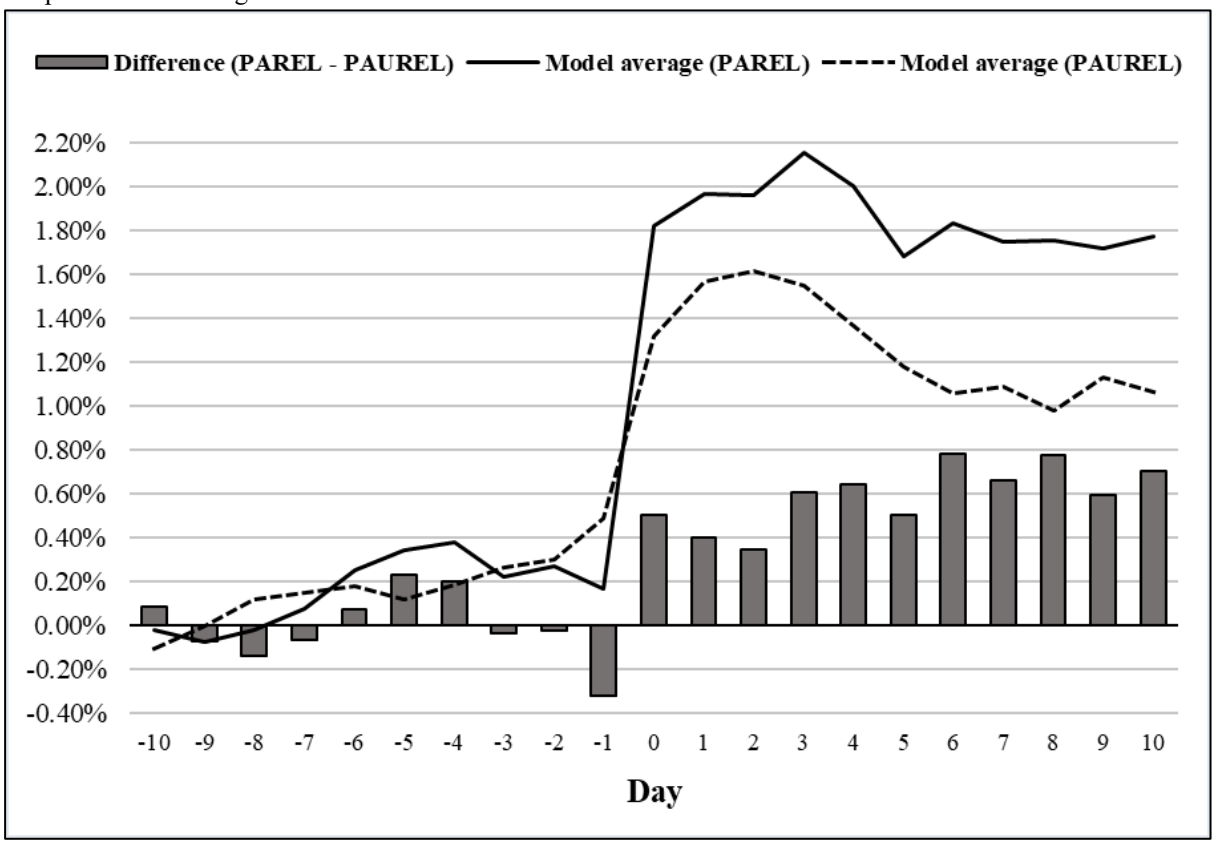
* $p < .10$
** $p < .05$
*** $p < .01$

6.5 Related and unrelated business alliance announcements

Prior studies have obtained mixed results concerning the effect of relatedness on business alliance performance. My Hypotheses 5a and 5b suggested that partner relatedness should not have a significant effect on the cumulative average abnormal return, but related business alliances were expected to perform better. First, to test Hypothesis 5a of no significant difference between related and unrelated partners, the sample is divided in respect to partner relatedness specified by three-digit SIC code matching. Figure 9 and Table 11, respectively, present the comparison between the cumulative average abnormal returns of firms announcing a business alliance with a related partner and those announcing an alliance with an unrelated partner. Table 24 and Table 25 in the Appendix provide further details on each respective estimation model.

Figure 9: Firms announcing a business alliance with related and unrelated partners

The below figure presents the comparison of cumulative average abnormal returns (CAAR) between firms announcing a business alliance with a related (PAREL) and an unrelated partner (PAUREL). The partners are considered related if their primary three-digit SIC codes match. The sub-samples include 391 business alliance announcements by related partners and 873 by unrelated partners during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.



Observing the results presented by Figure 9 and Table 11, business alliances announced by related partners experience similar trends as alliances announced by unrelated partners. Business alliances announced by related partners produce a cumulative average abnormal return of 1.77% during the entire 21-day event window [-10, 10]. The average for the three-day announcement period [-1, 1] is 1.70%. The respective results for unrelated partners are 1.07% during the 21-day event window [-10, 10] and 1.27% during the three-day announcement period [-1, 1]. Results for both types in the timeframes around the announcement date [0] are statistically significant also supported by the median values. Both types also experience pre-event positive returns and post-event negative returns, but the effect is only significant four to five days after the announcement [4, 5] where related partners generate a negative -0.48% and unrelated partners a negative -0.37% cumulative average abnormal return. The results are only statistically significant for unrelated partners considering the median values. When observing differences between the groups, statistical significance is only observed during the announcement date [0] where related partners outperform unrelated ones by a 0.82% margin. However, the median value is not supportive of the observed difference. Overall, considering the findings, business alliances with related partners seem to outperform alliances with unrelated partners but the differences are not statistically very significant except exactly during the announcement date when observing mean differences. However, the evidence is overall supportive of Hypothesis 5a of no significant differences between related and unrelated partners.

Next, to test Hypothesis 5b, which suggested higher abnormal returns for firms forming a business alliance in a related industry, the sample is divided into firms announcing a business alliance in a related and in an unrelated industry specified by three-digit SIC code matching. The criteria of a related business alliance are met if one or both the partners share a primary SIC code with the business alliance. Figure 10 and Table 12, respectively, present the comparison between the cumulative average abnormal returns of firms announcing a business alliance in a related industry and those announcing an alliance in an unrelated industry. Table 26 and Table 27 in the Appendix provide further details on each respective estimation model used to derive the abnormal returns.

Given the results presented in Figure 10 and Table 12, the related business alliances seem to outperform unrelated ones in the timeline before the announcement. The difference is statistically significant five to ten days before the announcement [-10, -5] by examining both

the mean and the median. However, especially during timeframes including the event, unrelated business alliances outperform related ones. For instance, during the three-day announcement period [-1, 1] unrelated business alliances generate a cumulative average abnormal return of 1.73% whereas related business alliances generate an average of 0.97%. The difference is statistically significant by observing both the mean and the median. However, given the entire 21-day event window, both types of business alliances experience almost equal cumulative average abnormal returns, 1.26% for related business alliances and 1.30% for unrelated business alliances. Given the overall picture, there does not seem to exist a related business alliance premium as was suggested by Hypothesis 5b.

Figure 10: Firms announcing a business alliance in related and unrelated industries

The below figure presents the comparison of cumulative average abnormal returns (CAAR) between firms announcing a business alliance in a related (BAREL) and an unrelated industry (BAUREL). The business alliance is considered related if one or both of the partners' primary three-digit SIC codes match with the primary three-digit SIC code of the business alliance. Given the criteria, the sub-samples include 550 related business alliance announcements and 714 unrelated business alliance announcements during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.

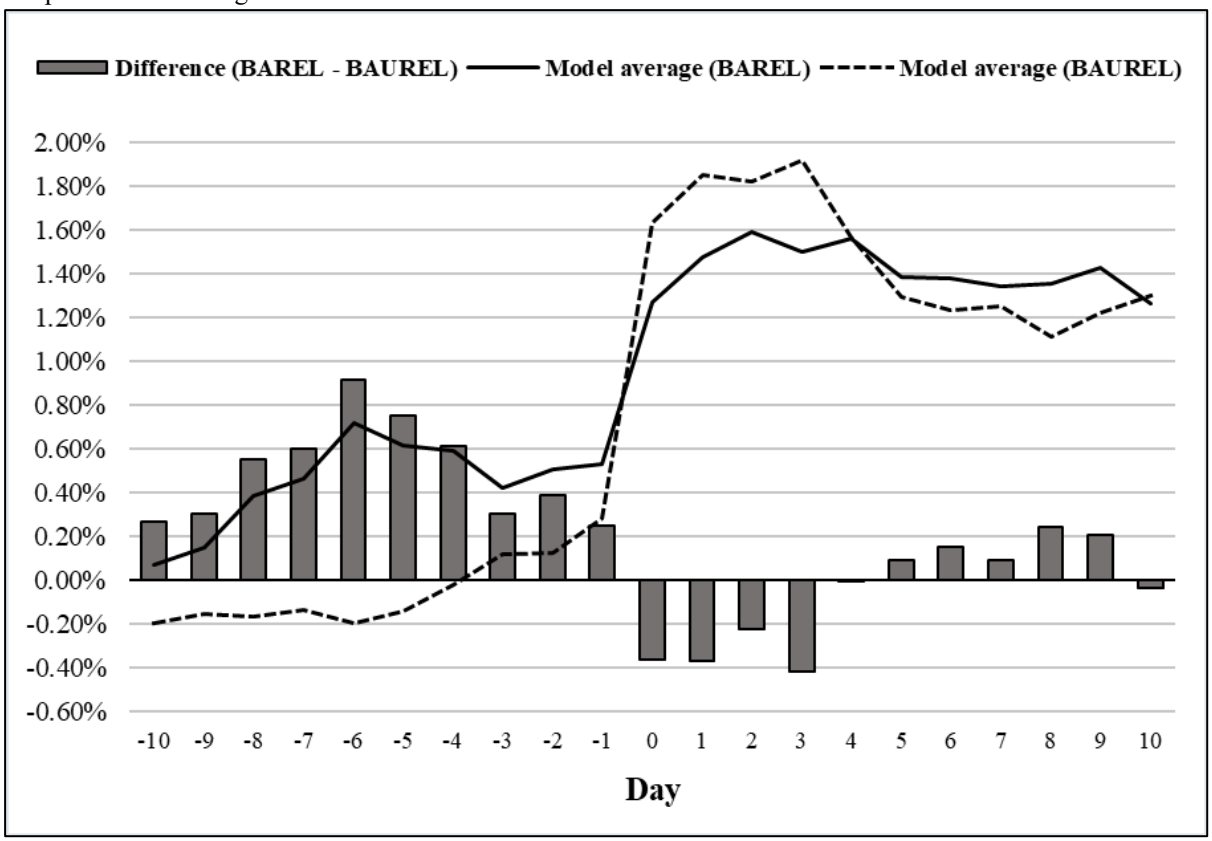


Table 11: Firms announcing a business alliance with related and unrelated partners

The below table presents the comparison between the cumulative abnormal average returns (CAAR) of firms announcing a business alliance with a related and an unrelated partner. The partners are considered related if their three-digit SIC codes match. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 391 business alliance announcements with a related partner and 873 announcements with an unrelated partner in the Nordic stock market during 2000-2018.

		Partner related (N = 391)				*Partner unrelated (N = 873)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
Pre-event	[-10, -5]	0.34%	(0.225)	0.20%	(0.254)	0.12%	(0.563)	0.04%	(0.614)	0.23%	(0.510)	0.16%	(0.444)
	[-10, -1]	0.17%	(0.701)	0.29%	(0.948)	0.49%	(0.071) *	0.17%	(0.371)	-0.32%	(0.530)	0.11%	(0.633)
	[-5, -1]	-0.08%	(0.821)	-0.35%	(0.213)	0.31%	(0.161)	-0.22%	(0.288)	-0.39%	(0.359)	-0.14%	(0.435)
	[-3, -1]	-0.21%	(0.496)	-0.35%	(0.099) *	0.31%	(0.109)	-0.12%	(0.771)	-0.52%	(0.156)	-0.23%	(0.142)
	[-1]	-0.10%	(0.488)	-0.07%	(0.194)	0.19%	(0.103)	-0.03%	(0.668)	-0.30%	(0.121)	-0.04%	(0.298)
Event	[-10, 10]	1.77%	(0.018) **	0.47%	(0.201)	1.07%	(0.012) **	0.08%	(0.245)	0.71%	(0.411)	0.39%	(0.662)
	[-5, 5]	1.43%	(0.014) **	-0.14%	(0.168)	1.00%	(0.004) ***	0.25%	(0.158)	0.43%	(0.522)	-0.38%	(0.702)
	[-3, 3]	1.78%	(0.001) ***	0.20%	(0.044) **	1.37%	(0.000) ***	0.28%	(0.002) ***	0.41%	(0.510)	-0.08%	(0.920)
	[-1, 0]	1.55%	(0.000) ***	0.33%	(0.001) ***	1.02%	(0.000) ***	0.22%	(0.000) ***	0.53%	(0.231)	0.11%	(0.582)
	[-1, 1]	1.70%	(0.000) ***	0.15%	(0.005) ***	1.27%	(0.000) ***	0.24%	(0.000) ***	0.43%	(0.412)	-0.09%	(0.785)
	[0]	1.65%	(0.000) ***	0.26%	(0.000) ***	0.83%	(0.000) ***	0.17%	(0.000) ***	0.82%	(0.045) **	0.09%	(0.223)
	[0, 1]	1.80%	(0.000) ***	0.23%	(0.001) ***	1.08%	(0.000) ***	0.14%	(0.000) ***	0.72%	(0.142)	0.08%	(0.566)
Post-event	[1]	0.15%	(0.481)	-0.10%	(0.618)	0.25%	(0.033) **	0.00%	(0.760)	-0.10%	(0.673)	-0.10%	(0.516)
	[1, 3]	0.34%	(0.236)	-0.32%	(0.317)	0.23%	(0.159)	0.03%	(0.586)	0.11%	(0.745)	-0.35%	(0.222)
	[1, 5]	-0.14%	(0.655)	-0.48%	(0.068) *	-0.14%	(0.438)	-0.15%	(0.105)	0.00%	(0.996)	-0.33%	(0.431)
	[1, 10]	-0.05%	(0.909)	-0.21%	(0.425)	-0.25%	(0.305)	-0.26%	(0.049) **	0.21%	(0.677)	0.05%	(0.698)
	[4, 5]	-0.48%	(0.051) *	-0.12%	(0.166)	-0.37%	(0.001) ***	-0.20%	(0.006) ***	-0.10%	(0.698)	0.08%	(0.790)
	[5, 10]	-0.24%	(0.500)	-0.12%	(0.298)	-0.30%	(0.136)	-0.21%	(0.022) **	0.06%	(0.873)	0.08%	(0.678)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

Table 12: Firms announcing a business alliance in related and unrelated industries

The below table presents the comparison of cumulative average abnormal returns (CAAR) between firms announcing a business alliance in a related and an unrelated industry. The business alliance is considered related if one or both of the partners' primary three-digit SIC codes match with the primary three-digit SIC code of the business alliance, otherwise the business alliance is considered unrelated. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 550 related business alliance announcements and 714 unrelated business alliance announcements in the Nordic stock market during 2000-2018.

		Rel. bus. alliance CAAR (N = 550)				*Urel. bus. alliance CAAR (N = 714)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
Pre-event	[-10, -5]	0.61%	(0.005) ***	0.33%	(0.008) ***	-0.14%	(0.542)	-0.06%	(0.370)	0.75%	(0.019) **	0.39%	(0.011) **
	[-10, -1]	0.53%	(0.100) *	0.32%	(0.235)	0.28%	(0.385)	0.12%	(0.949)	0.25%	(0.588)	0.21%	(0.333)
	[-5, -1]	-0.19%	(0.468)	-0.42%	(0.072) *	0.48%	(0.075) *	-0.18%	(0.623)	-0.67%	(0.074) *	-0.25%	(0.241)
	[-3, -1]	-0.06%	(0.773)	-0.20%	(0.081) *	0.31%	(0.201)	-0.11%	(0.945)	-0.37%	(0.250)	-0.09%	(0.204)
	[-1]	0.02%	(0.863)	-0.09%	(0.254)	0.16%	(0.240)	-0.01%	(0.653)	-0.14%	(0.439)	-0.08%	(0.589)
Event	[-10, 10]	1.26%	(0.016) **	-0.06%	(0.625)	1.30%	(0.013) **	0.34%	(0.069) *	-0.04%	(0.962)	-0.39%	(0.397)
	[-5, 5]	0.67%	(0.093) *	-0.10%	(0.983)	1.49%	(0.001) ***	0.30%	(0.011) **	-0.83%	(0.157)	-0.40%	(0.083) *
	[-3, 3]	0.91%	(0.012) **	-0.08%	(0.582)	1.95%	(0.000) ***	0.67%	(0.000) ***	-1.03%	(0.061) *	-0.76%	(0.010) **
	[-1, 0]	0.76%	(0.001) ***	0.10%	(0.056) *	1.51%	(0.000) ***	0.34%	(0.000) ***	-0.75%	(0.034) **	-0.23%	(0.037) **
	[-1, 1]	0.97%	(0.000) ***	0.07%	(0.067) *	1.73%	(0.000) ***	0.33%	(0.000) ***	-0.76%	(0.075) *	-0.26%	(0.050) **
	[0]	0.74%	(0.001) ***	0.08%	(0.032) **	1.35%	(0.000) ***	0.26%	(0.000) ***	-0.61%	(0.055) *	-0.18%	(0.019) **
	[0, 1]	0.95%	(0.000) ***	0.03%	(0.061) *	1.57%	(0.000) ***	0.27%	(0.000) ***	-0.62%	(0.118)	-0.24%	(0.040) **
Post-event	[1]	0.21%	(0.113)	-0.02%	(0.902)	0.22%	(0.143)	-0.03%	(0.985)	-0.01%	(0.970)	0.01%	(0.938)
	[1, 3]	0.23%	(0.250)	-0.07%	(0.855)	0.29%	(0.152)	-0.07%	(0.973)	-0.05%	(0.851)	0.00%	(0.896)
	[1, 5]	0.12%	(0.587)	-0.09%	(0.291)	-0.34%	(0.138)	-0.41%	(0.024) **	0.45%	(0.145)	0.32%	(0.440)
	[1, 10]	0.00%	(0.988)	-0.23%	(0.191)	-0.33%	(0.270)	-0.26%	(0.102)	0.33%	(0.442)	0.02%	(0.850)
	[4, 5]	-0.12%	(0.403)	-0.15%	(0.232)	-0.62%	(0.000) ***	-0.20%	(0.003) ***	0.51%	(0.018) **	0.06%	(0.254)
	[5, 10]	-0.30%	(0.219)	-0.24%	(0.010) **	-0.27%	(0.285)	-0.09%	(0.277)	-0.03%	(0.931)	-0.15%	(0.280)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

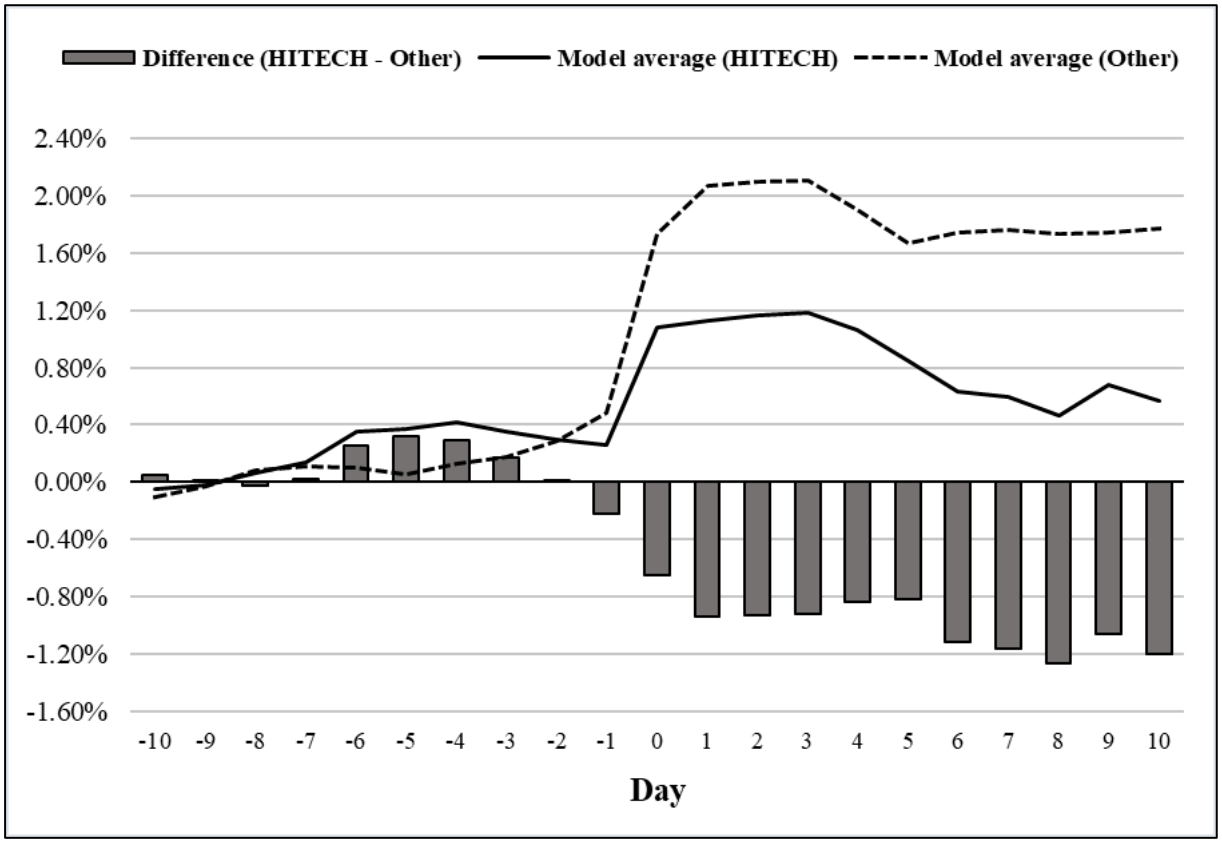
* $p < .10$
** $p < .05$
*** $p < .01$

6.6 High-technology business alliance announcements

Previous research has implied that high-technology business alliances generate greater cumulative average abnormal returns compared to other types of business alliances. To test Hypothesis 6 of a high-tech premium, the sample is divided into high-technology business alliances and other alliances by their three-digit SIC codes. The criteria of being considered high-technology is obtained from Kile and Philips' (2009) benchmark optimization of high-technology three-digit SIC codes. Figure 11 and Table 13, respectively, present the comparison between the cumulative average abnormal returns of firms announcing high-technology business alliances and those announcing other types of business alliances. Table 28 and Table 29 in the Appendix provide further details on each respective estimation model.

Figure 11: Firms announcing a business alliance in high-tech and other industries

The below figure presents the comparison of cumulative average abnormal returns (CAAR) between firms announcing a business alliance in high-technology industries and in other industries. The business alliance is considered high-tech if it meets Kile and Philips' (2009) three-digit SIC code criteria. The sub-samples include 511 high-technology business alliance announcements and 753 other business alliance announcements during 2000-2018 in the Nordic stock market. The event window illustrated is the 21-day period around the announcement date [-10, 10]. The estimation models used to derive the abnormal returns are the market model, the market-adjusted model, and the Dimson beta model, respectively. The averages of the estimation models for each sub-sample and the difference between the sub-samples' model averages is demonstrated.



By examining the findings illustrated in Figure 11 and Table 13, it can be observed that business alliances formed in high-technology industries underperform compared to business alliances in other industries. There are no significant differences in the pre-event and post-event timelines, but the differential effect occurs during timeframes including the announcement date. The difference is most significant in the three-day announcement period [-1, 1] where the difference is 0.95% in favour of non-high-technology business alliances. The median values also support this finding. However, considering the entire 21-day event window [-10, 10], the difference is not statistically significant, although noticeable, as high-technology business alliances underperform by 1.21% on average and by 0.84% considering the median.

The finding of high-technology business alliance underperformance is in contrast with most of previous literature. Some explanations could include investor scepticism towards the high-technology sector after the burst of the dot-com bubble in the early 2000s. This may have guided investors to be more careful when investing in highly risky technological ventures. Hypothesis 6 suggested a premium for high-technology business alliances. However, my results are not supportive of the hypothesis. In contrast, my results generally imply an opposite effect of high-technology underperformance.

Table 13: Firms announcing a business alliance in high-tech and other industries

The below table presents the comparison of cumulative average abnormal returns (CAAR) between firms announcing a business alliance in high-technology industries and in other industries. The business alliance is considered high-tech if it meets Kile and Philips' (2009) three-digit SIC code criteria. The comparison utilizes the average of the three estimation models used to derive the abnormal returns. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sub-samples consist of 511 high-technology business alliance announcements and 753 other alliance announcements in the Nordic stock market during 2000-2018.

		High-tech business alliance (N = 511)				*Other business alliance (N = 753)*				*Difference CAAR*			
	Event window	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[c]**	**Median**	**p[d]**
Pre-event	[-10, -5]	0.38%	(0.135)	0.30%	(0.067) *	0.06%	(0.791)	-0.03%	(0.891)	0.32%	(0.334)	0.34%	(0.133)
	[-10, -1]	0.26%	(0.447)	0.26%	(0.387)	0.48%	(0.124)	0.16%	(0.810)	-0.22%	(0.624)	0.10%	(0.648)
	[-5, -1]	-0.10%	(0.716)	-0.49%	(0.094) *	0.38%	(0.145)	-0.17%	(0.518)	-0.48%	(0.200)	-0.32%	(0.393)
	[-3, -1]	-0.16%	(0.461)	-0.27%	(0.128)	0.35%	(0.126)	-0.10%	(0.762)	-0.51%	(0.105)	-0.17%	(0.313)
	[-1]	-0.04%	(0.746)	-0.05%	(0.221)	0.19%	(0.148)	-0.02%	(0.669)	-0.23%	(0.194)	-0.02%	(0.461)
Event	[-10, 10]	0.57%	(0.310)	-0.21%	(0.979)	1.77%	(0.000) ***	0.63%	(0.027) **	-1.21%	(0.106)	-0.84%	(0.153)
	[-5, 5]	0.49%	(0.231)	-0.32%	(0.806)	1.57%	(0.000) ***	0.48%	(0.007) ***	-1.08%	(0.065) *	-0.80%	(0.059) *
	[-3, 3]	0.77%	(0.038) **	-0.21%	(0.709)	1.99%	(0.000) ***	0.69%	(0.000) ***	-1.21%	(0.027) **	-0.91%	(0.011) **
	[-1, 0]	0.79%	(0.002) ***	0.08%	(0.114)	1.45%	(0.000) ***	0.38%	(0.000) ***	-0.66%	(0.064) *	-0.30%	(0.028) **
	[-1, 1]	0.83%	(0.002) ***	0.08%	(0.164)	1.79%	(0.000) ***	0.34%	(0.000) ***	-0.95%	(0.024) **	-0.26%	(0.024) **
	[0]	0.83%	(0.000) ***	0.09%	(0.014) **	1.26%	(0.000) ***	0.24%	(0.000) ***	-0.43%	(0.185)	-0.15%	(0.106)
	[0, 1]	0.87%	(0.001) ***	0.10%	(0.017) **	1.59%	(0.000) ***	0.21%	(0.000) ***	-0.72%	(0.065) *	-0.11%	(0.214)
Post-event	[1]	0.04%	(0.708)	-0.08%	(0.517)	0.33%	(0.031) **	0.00%	(0.648)	-0.29%	(0.124)	-0.08%	(0.437)
	[1, 3]	0.10%	(0.621)	-0.07%	(0.641)	0.37%	(0.057) *	-0.07%	(0.855)	-0.27%	(0.339)	0.00%	(0.593)
	[1, 5]	-0.24%	(0.306)	-0.40%	(0.027) **	-0.07%	(0.735)	-0.18%	(0.200)	-0.17%	(0.592)	-0.22%	(0.351)
	[1, 10]	-0.52%	(0.125)	-0.43%	(0.037) **	0.03%	(0.906)	-0.11%	(0.333)	-0.55%	(0.208)	-0.33%	(0.316)
	[4, 5]	-0.34%	(0.056) *	-0.21%	(0.064) *	-0.45%	(0.001) ***	-0.17%	(0.016) **	0.10%	(0.651)	-0.04%	(0.890)
	[5, 10]	-0.50%	(0.062) *	-0.31%	(0.005) ***	-0.13%	(0.574)	-0.07%	(0.366)	-0.37%	(0.298)	-0.24%	(0.116)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

[c] Numbers in parantheses represent p-values for the null hypothesis that the difference between the means is zero using the Welch's t-test.

[d] The statistical significance for the median difference is obtained with Wilcoxon signed-ranks test for two unpaired samples using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the difference between the medians is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

6.7 Multiple regression results

The multiple regression model's purpose is to further test the implications of the hypotheses constructed earlier and to add statistical robustness to my findings. Table 14 presents the results of the multiple regression. The coefficient JV for joint ventures is insignificant, implying that there is no statistically significant difference between forming joint ventures and strategic alliances. Thus, the result is supportive of Hypothesis 2. The result is also in line with my previous findings illustrated in Figure 4 and Table 6 when comparing means and medians of joint ventures and strategic alliances.

The overall picture given by the regression analysis is that the firm's previous performance and the volatility associated with it are of important concern when investors consider the information provided by business alliance announcements. Firms that have performed subpar compared to the market benchmark experience greater abnormal returns from the announcements as is suggested by the control variable coefficient LTMDIF in Table 14. The finding is statistically significant during all event windows including the announcement date. The Nordic stock market seems to respond favorably to underperforming firms announcing a business alliance which could indicate that investors on average take the announcement as a positive signal suggesting that the firms in question are attempting to improve their profitability. Firms also experiencing greater annual volatility tend to produce greater cumulative abnormal returns from the business alliance announcements as suggested by the control variable coefficient LTMVOL in Table 14. This effect is likely explained by the fact that small firms often have greater volatility compared to larger firms, and as was witnessed earlier in my paper, small cap firms outperformed other firms by a large margin. Furthermore, the multiple regression results support the suggested finding of a small firm premium as the significance of the market value coefficient MV(LN) is statistically very high in all the models in Table 14. The larger the firm is measured by its market capitalization, the lower its cumulative abnormal returns are. Thus, the regression results are also supportive of Hypothesis 3 suggesting a small firm premium. The results earlier in Figure 5 and Table 7 also provide evidence for this conclusion.

Furthermore, the multiple regression results imply, that when the partner of the business alliance is from a foreign country, the announcements tend to generate greater cumulative abnormal returns. The effect is statistically significant during the entire 21-day event window

[-10, 10] as shown in Table 14 in Model IV by the coefficient PAINT. The finding is similar to the results observed in Figure 7 and Table 9. Given the findings, there seems to be very little support for a premium considering domestic partners as suggested by Hypothesis 4a. Hypothesis 4b implied no significant difference between announcing a business alliance domestically or internationally. The implications of the multiple regression analysis are in line with the hypothesis as the coefficient BAINT for business alliance internationality is statistically insignificant. The findings in Figure 8 and Table 10 are also supportive of this conclusion. Even though business alliances domestically seem to outperform international ones, the differences are not statistically significant enough to reject Hypothesis 4b.

Hypothesis 5a and 5b were concerned in the relatedness of the partner and the business alliance influencing the abnormal returns generated by the business alliance announcements. As shown in the regression results in Table 14, no significant effect is observed for the coefficients PAREL and BAREL regarding relatedness. The results discussed earlier in Figure 9, Figure 10, Table 11, and Table 12 also support the general insignificance of the relatedness criteria affecting the cumulative abnormal returns although some evidence of significant differences during a few specific event windows were detected. Finally, the multiple regression results offer some support for my earlier findings regarding business alliances' subpar performance in the high-technology industry. Model I suggests that the negative effect of high-tech business alliances during the three-day announcement period [-1, 1] is statistically significant at the 10% level as suggested by the coefficient HITECH. However, no significant differences are observed in the broader event windows in Models II-IV. Overall, the results of the multiple regression model regarding high-technology business alliances do not offer evidence in support of Hypothesis 6 as high-tech business alliances seem to generally underperform. The negative difference between high-technology and other types of business alliances, especially around the announcement date, is also seen in Figure 11 and Table 13 earlier in my paper.

Table 14: OLS multiple regression results

The below table reports the OLS multiple regression results of 1245 business alliance announcements in the Nordic stock market during 2000-2018. 19 observations were omitted due to incomplete data. The dependent variable is the cumulative abnormal return (CAR) of an observed firm. Model I examines the three-day [-1, 1] cumulative abnormal return around the announcement date [0] as the dependent variable. Models II-IV examine the 7-day [-3, 3], 11-day [-5, 5], and 21-day [-10, 10] cumulative abnormal returns. BTM is the firm's book-to-market ratio, LTMDIF is the difference between the firm's return and the market benchmark's return during the estimation period, LTMVOL is the annualized volatility of the firm's return during the estimation period, BAMANU is a dummy variable taking the value 1 if the business alliance announced is of manufacturing type, BAMARK is a dummy variable taking the value 1 if the business alliance is of marketing type, BARND is a dummy variable taking the value 1 if the business alliance is of research and development type, PAPRIV is a dummy variable taking the value 1 if the partner is a private firm, JV is a dummy variable taking the value 1 if the business alliance is a joint venture, MV(LN) is the natural logarithm of the announcing firm's market value, PAINT is a dummy variable taking the value 1 if the partner is international, BAINT is a dummy variable taking the value 1 if the business alliance is fully international, PAREL is a dummy variable taking the value 1 if the partner is in a related industry, BAREL is a dummy variable taking the value 1 if the business alliance is related to one or both partners, and HITECH is a dummy variable taking the value 1 if the business alliance's industry is considered high-tech. The p-values and their statistical significance are also demonstrated.

Dependent variable: CAR	**Model I** *CAR [-1, 1]*		**Model II** *CAR [-3, 3]*		**Model III** *CAR [-5, 5]*		**Model IV** *CAR [-10, 10]*	
Intercept:	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
CONSTANT	0.022	(0.054) *	0.024	(0.125)	0.014	(0.404)	0.004	(0.866)
Control variables:								
BTM	0.001	(0.887)	0.008	(0.213)	0.011	(0.118)	0.008	(0.325)
LTMDIF	-0.012	(0.001) ***	-0.017	(0.000) ***	-0.017	(0.002) ***	-0.023	(0.001) ***
LTMVOL	0.067	(0.000) ***	0.054	(0.000) ***	0.044	(0.001) ***	0.064	(0.000) ***
BAMANU	0.004	(0.508)	-0.006	(0.449)	-0.006	(0.456)	-0.006	(0.580)
BAMARK	-0.010	(0.123)	-0.007	(0.466)	0.000	(0.993)	0.007	(0.579)
BARND	0.009	(0.180)	0.009	(0.352)	0.003	(0.742)	-0.005	(0.704)
PAPRIV	0.002	(0.662)	0.005	(0.428)	0.006	(0.318)	-0.003	(0.677)
Explanatory variables:								
JV	0.000	(0.949)	0.003	(0.678)	0.003	(0.675)	0.002	(0.787)
MV(LN)	-0.005	(0.000) ***	-0.005	(0.000) ***	-0.004	(0.000) ***	-0.005	(0.001) ***
PAINT	0.002	(0.794)	0.015	(0.092) *	0.014	(0.136)	0.027	(0.022) **
BAINT	-0.001	(0.799)	-0.005	(0.389)	-0.005	(0.462)	-0.005	(0.544)
PAREL	-0.001	(0.786)	0.000	(0.968)	-0.001	(0.926)	0.002	(0.836)
BAREL	-0.005	(0.275)	-0.009	(0.112)	-0.009	(0.164)	-0.001	(0.888)
HITECH	-0.009	(0.075) *	-0.007	(0.260)	-0.004	(0.599)	-0.007	(0.411)
Regression statistics:								
R^2	0.112		0.082		0.056		0.055	
Adj. R^2	0.102		0.071		0.046		0.044	
Observations	1245		1245		1245		1245	

* $p < .10$
** $p < .05$
*** $p < .01$

7. Discussion

Overall, the findings of my study indicated mixed results for the constructed hypotheses. Some hypotheses were easily confirmed but for the others I struggled to find definitive proof, and on some occasions, I ended up with results suggesting an opposite effect compared to the hypothesis' implications. The analyses in my paper indicate that joint ventures and strategic alliances generally produce abnormal positive returns for the firms announcing them. The finding is in line with most of the previous literature which has suggested a positive market reaction for such announcements as was suggested by Hypothesis 1. However, the effect seems to be somewhat larger in my study of the Nordic market during the current millennium. Where other studies in the U.S. during different eras have generally found the positive market reaction to be lower than 1%, my results imply that the positive market effect is approximately 1.40% around the three days of the announcement date [-1. 1], and approximately 1.30% around the three weeks surrounding the announcement [-10, 10]. Given my findings, I feel confident in accepting Hypothesis 1 of general positive market reaction regarding business alliances in the Nordic stock market. However, when comparing the differences in cumulative average abnormal returns between two types of business alliances, joint ventures and strategic alliances precisely, I could not draw statistically significant results to support Hypothesis 2 of a joint venture premium. Neither the sub-sample analysis nor the results from the multiple regression yielded statistically significant results in favor of a joint venture premium. Therefore, relying on the entirety of my findings, Hypothesis 2 is rejected.

The most striking finding in my study was the fact that small cap firms to generate higher returns than large cap firms by a large margin. The effect was statistically significant both in the sub-sample analysis and in the multiple regression analysis. The finding is also in line with previous literature which has widely documented the small firm premium. However, I find the premium to be larger than documented previously. The result could be explained by my sampling where I set a fixed threshold on market value, whereas prior studies have often used relative size in order to measure the small firm effect. The small firm premium effect persisted in the multiple regression analysis where no such artificial thresholds were placed. Other explanations for the premium might include behavioral investor biases. For instance, small firms make less announcements compared to larger firms which might amplify the impact of noise traders on the stock price. Furthermore, the announcement of a business alliance is usually more meaningful to a small firm and might signal better relative growth prospects and future

cash flows compared to larger firms. Given all the evidence, Hypothesis 2 of a small firm premium is accepted.

My paper also examined the effect of internationality and industry relatedness on the cumulative average abnormal returns of firms announcing business alliances. The results suggested a premium for business alliances formed by companies that do not belong to the same nation. Both the sub-sample analysis and the regression analysis supported the finding during the entire 21-day event window [-10, 10], but the proof for other event windows was less exhaustive. Still, the findings are contradictory to Hypothesis 4a which implied a premium for domestically formed business alliances. My results mostly suggest the opposite in the Nordic stock market as business alliances with domestic partners seemed to rather underperform. Therefore, Hypothesis 4a of a domestic partner premium is rejected as suggested by my evidence. I also examined the effect of internationality regarding the location of the business alliances. However, I was not able to find consistent proof that business alliances formed domestically or internationally would outperform neither in the sub-sample comparison nor in the multiple regression analysis. Thus, Hypothesis 4b of no significant difference between the two types is accepted.

Regarding the relatedness of the business alliances announced, my paper examined the effect on two fronts. First, Hypothesis 5a suggested that business alliances formed by partners in related industries and in unrelated industries do not generate significantly different abnormal returns. Only the sub-sample analysis presents a significant difference during the announcement date [0] in favor of related partners. Otherwise, the entirety of the findings is statistically insignificant. Therefore, Hypothesis 5a of no significant differences is accepted. Hypothesis 5b examined the effect of the business alliance's relatedness on the cumulative average abnormal returns and suggested that related business alliances perform better. The sub-sample analysis suggested that unrelated business alliances generate higher cumulative average abnormal returns, especially during timeframes around the announcement date [0]. The results obtained from the multiple regression analysis were similar, although insignificant, considering the phenomenon. Given the entirety of findings, I will reject Hypothesis 5b of a related industry premium for business alliances as they were not shown to outperform unrelated alliances. The last objective of my paper was to examine whether high-technology business alliances generate greater cumulative abnormal returns compared to other types of alliances. Hypothesis 6 suggested a premium for high-tech firms. My results mostly imply an opposite effect in the

Nordic stock market. According to both the sub-sample and the multiple regression analysis, the differential effect seems to occur in the proximity of the announcement date [0] where high-technology business alliances underperform compared to other business alliances. However, during the entire 21-day event window [-10, 10] the effect becomes statistically insignificant. Given the overall results, I will reject Hypothesis 6 as my evidence suggests that high-tech business alliances tend to underperform in the Nordic stock market.

7.1 Limitations and further research

My results naturally have limitations. The first important limitations are concerned with the methodology. The effect of a successful business alliance is measured by the abnormal stock market return of a given firm during a specific timeframe. The event study methodology associated with this approach has both advantages and disadvantages. The advantage is the ability to capture the immediate stock market effect of the business alliance announcements given that the stock market behaves at least semi-effectively. The large sample size is also able to adequately suppress the effect of a few extreme observations. However, the event study methodology implemented in my study does not capture the long-term benefits and disadvantages of forming a business alliance. The decisions to form business alliances are usually very strategic in nature and could be difficult for the stock market to correctly value without insider information. Therefore, it is possible that the relatively high cumulative average abnormal returns in my study arise from investor biases such as noise trading. Some evidence of this phenomenon is indicated by the rather large post-event adjustments to the cumulative average abnormal returns after the announcement date. Further research could address the potential problem and exclusively examine the post-event negative trend and long-term performance of firms announcing business alliances. For instance, comparison between the performance of similar firms announcing business alliances and those not announcing them, could be conducted to answer the long-term success argument. Furthermore, more sophisticated regression models could be implemented to explain the cumulative average abnormal returns given the circumstances and the scope of the objectives for the research.

Another important limitation arises from my sample size and sub-sampling. The data only includes data during the 2000s and only in the Nordic stock market. Furthermore, the data consists of only public firms. Therefore, the results might not apply to different markets with different characteristics and are not applicable to private firms, for instance. The sample is also

divided into different sub-samples often with the primary three-digit SIC codes. Many public firms have numerous industries where they operate and simplifying the firm's industry to only one specific primary industry could cause biases in the results. The same problem occurs in the sampling of high-technology firms where primary three-digit SIC codes were also used. Further research could examine the cumulative average abnormal returns with different criteria for sub-sampling and in different stock markets with an even larger sample size to draw more definitive conclusions. Additional criteria for examining the performance of private firms could also be considered and comparisons between different timelines could be examined, for instance, before and after the dot-com bubble for high-technology business alliances, and more generally, before and after the financial crisis for all business alliances.

7.2 Conclusion

My paper examined the stock market effect of announcing business alliances in the Nordic stock market during 2000-2018 with a sample of 1264 business alliance announcements using event study methodology as the core method of analysis. My paper addressed two key questions: whether business alliances in the Nordics generally produce positive cumulative abnormal returns and which types of business alliances given their characteristics tend to outperform other types of alliances. For the first key question regarding general stock market performance in the Nordics, my study was able to find consistent proof of positive stock market reactions to all business alliance announcements. The finding is robust and consistent with many different statistical methods and estimation models. However, I found mixed results for the various hypotheses constructed around the second key question regarding important differences between business alliance types and their characteristics. My results suggested that there is no significant difference in the abnormal returns between joint venture and strategic alliance announcements and that most of the differences between business alliance characteristics were statistically not very significant. However, there were a few notable exceptions: the extremely strong small firm premium and the subpar performances of business alliances formed with domestic partners or in the high-technology industry.

Overall, my paper offers a very broad and extensive overview on the stock market reaction to announcements of business alliances and on their key characteristics in the Nordic stock market. The findings in my study can be used as a reliable reference for further studies approaching similar questions and issues regarding interfirm co-operation.

References

Allen, J. W., & Phillips, G. M. (2000). Corporate equity ownership, strategic alliances, and product market relationships. The Journal of Finance, 55(6), 2791-2815.

Anand, B. N., & Khanna, T. (2000). Do firms learn to create value? The case of alliances. Strategic Management Journal, 21(3), 295-315.

Arino, A., & De La Torre, J. (1998). Learning from failure: Towards an evolutionary model of collaborative ventures. Organization Science, 9(3), 306-325.

Balakrishnan, S., & Koza, M. P. (1993). Information asymmetry, adverse selection and joint-ventures: Theory and evidence. Journal of Economic Behavior & Organization, 20(1), 99-117.

Barber, B. M., Odean, T., & Zhu, N. (2009). Systematic noise. Journal of Financial Markets, 12(4), 547-569.

Berger, P. G., & Ofek, E. (1995). Diversification's effect on firm value. Journal of Financial Economics, 37(1), 39-65.

Campa, J. M., & Kedia, S. (2002). Explaining the diversification discount. The Journal of Finance, 57(4), 1731-1762.

Chan, S. H., Kensinger, J. W., Keown, A. J., & Martin, J. D. (1997). Do strategic alliances create value?. Journal of Financial Economics, 46(2), 199-221.

Chung, I. Y., Koford, K. J., & Lee, I. (1993). Stock market views of corporate multinationalism: Some evidence from announcements of international joint ventures. The Quarterly Review of Economics and Finance, 33(3), 275-293.

Comment, R., & Jarrell, G. A. (1995). Corporate focus and stock returns. Journal of Financial Economics, 37(1), 67-87.

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under-and overreactions. The Journal of Finance, 53(6), 1839-1885.

Das, S., Sen, P. K., & Sengupta, S. (1998). Impact of strategic alliances on firm valuation. Academy of Management Journal, 41(1), 27-41.

Dimson, E. (1979). Risk measurement when shares are subject to infrequent trading. Journal of Financial Economics, 7(2), 197-226.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. International Economic Review, 10(1), 1-21.

Fama, E. F. (1991). Efficient capital markets: II. The Journal of Finance, 46(5), 1575-1617.

Harrigan, K. R. (1988). Joint ventures and competitive strategy. Strategic Management Journal, 9(2), 141-158.

Hennart, J. F. (1988). A transaction costs theory of equity joint ventures. Strategic Management Journal, 9(4), 361-374.

Hennart, J. F., & Reddy, S. (1997). The choice between mergers/acquisitions and joint ventures: The case of Japanese investors in the United States. Strategic Management Journal, 1-12.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. The American Economic Review, 76(2), 323-329.

Kale, P., Dyer, J. H., & Singh, H. (2002). Alliance capability, stock market response, and long-term alliance success: the role of the alliance function. Strategic Management Journal, 23(8), 747-767.

Kile, C. O., & Phillips, M. E. (2009). Using industry classification codes to sample high-technology firms: Analysis and recommendations. Journal of Accounting, Auditing & Finance, 24(1), 35-58.

Kogut, B. (1991). Joint ventures and the option to expand and acquire. Management Science, 37(1), 19-33.

Koh, J., & Venkatraman, N. (1991). Joint venture formations and stock market reactions: An assessment in the information technology sector. Academy of Management Journal, 34(4), 869-892.

Lee, I., & Wyatt, S. B. (1990). The effects of international joint ventures on shareholder wealth. Financial Review, 25(4), 641-649.

MacKinlay, A. C. (1997). Event studies in economics and finance. Journal of Economic Literature, 35(1), 13-39.

McConnell, J. J., & Nantell, T. J. (1985). Corporate combinations and common stock returns: The case of joint ventures. The Journal of Finance, 40(2), 519-536.

Merchant, H., & Schendel, D. (2000). How do international joint ventures create shareholder value?. Strategic Management Journal, 21(7), 723-737.

Mitchell, M., Pulvino, T., & Stafford, E. (2002). Limited arbitrage in equity markets. The Journal of Finance, 57(2), 551-584.

Mody, A. (1993). Learning through alliances. Journal of Economic Behavior & Organization, 20(2), 151-170.

Park, S. H., & Kim, D. (1997). Market valuation of joint ventures: Joint venture characteristics and wealth gains. Journal of Business Venturing, 12(2), 83-108.

Pontiff, J., & Schall, L. D. (1998). Book-to-market ratios as predictors of market returns. Journal of Financial Economics, 49(2), 141-160.

Reuer, J. J., & Koza, M. P. (2000). Asymmetric information and joint venture performance: Theory and evidence for domestic and international joint ventures. Strategic Management Journal, 81-88.

Reuer, J. J., & Miller, K. D. (1997). Agency costs and the performance implications of international joint venture internalization. Strategic Management Journal, 18(6), 425-438.

Shleifer, A., & Vishny, R. W. (1991). Takeovers in the'60s and the'80s: Evidence and Implications. Strategic Management Journal, 12(S2), 51-59.

Sorokina, N., Booth, D. E., & Thornton Jr, J. H. (2013). Robust Methods in Event Studies: Empirical Evidence and Theoretical Implications. Journal of Data Science, 11.

Stuart, T. E., Hoang, H., & Hybels, R. C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. Administrative Science Quarterly, 44(2), 315-349.

Tong, T. W., Reuer, J. J., & Peng, M. W. (2008). International joint ventures and the value of growth options. Academy of Management Journal, 51(5), 1014-1029.

Villalonga, B. (2004). Diversification discount or premium? New evidence from the business information tracking series. The Journal of Finance, 59(2), 479-506.

Woolridge, J. R., & Snow, C. C. (1990). Stock market reaction to strategic investment decisions. Strategic Management Journal, 11(5), 353-363.

Appendix

The Appendix provides the exact results obtained by the event study methodology from the three different estimation models used to examine the different hypotheses of my research. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. The equations used to derive the estimation models are found in the methodology section of my paper.

Tables 15 and 16 provide the results for all estimation models concerning joint ventures and strategic alliances. The results are used to examine Hypothesis 1 which suggests a general positive market reaction to business alliances, and Hypothesis 2 which suggests a joint venture premium over strategic alliances.

Tables 17, 18, and 19 provide results for all estimation models concerning small cap, mid-cap, and large cap firms announcing business alliances. The results are used to examine Hypothesis 3 which suggests a small firm premium.

Tables 20, 21, 22, and 23 provide results for all estimation models concerning business alliances formed with a domestic or a foreign partner and business alliances formed domestically or internationally by the alliance's location. The results are used to examine Hypothesis 4a, which suggests a premium for domestic partners, and Hypothesis 4b implying no significant difference between domestic and international business alliances measured by the alliance's location.

Tables 24, 25, 26, and 27 provide results for all estimation models concerning the industry relatedness of the partner and of the business alliance. The results are used to examine Hypothesis 5a, which suggests no significant difference between related and unrelated partners, and Hypothesis 5b, which implies a premium for related business alliances compared to unrelated business alliances.

Tables 28 and 29 provide results for all estimation models concerning the technology of the business alliance. The results are used to examine Hypothesis 6, which suggests a premium for high-technology business alliances.

Table 15: Joint venture announcements

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a joint venture. The results are provided by all three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 424 joint venture announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 424	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.27%	(0.355)	0.30%	(0.059) *	0.54%	(0.081) *	0.34%	(0.015) **	0.34%	(0.259)	0.36%	(0.027) **
	[-10, -1]	0.40%	(0.365)	0.47%	(0.228)	0.60%	(0.180)	0.45%	(0.119)	0.43%	(0.340)	0.49%	(0.185)
Pre-event	[-5, -1]	0.10%	(0.762)	-0.20%	(0.325)	0.18%	(0.600)	-0.13%	(0.578)	0.09%	(0.780)	-0.11%	(0.378)
	[-3, -1]	0.15%	(0.611)	-0.15%	(0.620)	0.05%	(0.872)	-0.07%	(0.604)	0.12%	(0.700)	-0.11%	(0.634)
	[-1]	0.14%	(0.225)	0.01%	(0.455)	0.10%	(0.404)	0.02%	(0.313)	0.13%	(0.269)	0.01%	(0.484)
	[-10, 10]	1.17%	(0.082) *	0.40%	(0.291)	1.75%	(0.010) **	0.71%	(0.023) **	1.24%	(0.064) *	0.41%	(0.221)
	[-5, 5]	1.17%	(0.025) **	0.17%	(0.235)	1.52%	(0.005) ***	0.56%	(0.018) **	1.21%	(0.021) **	0.27%	(0.182)
	[-3, 3]	1.53%	(0.003) ***	0.52%	(0.009) ***	1.57%	(0.003) ***	0.60%	(0.004) ***	1.50%	(0.003) ***	0.57%	(0.006) ***
Event	[-1, 0]	1.20%	(0.000) ***	0.37%	(0.000) ***	1.22%	(0.001) ***	0.41%	(0.000) ***	1.18%	(0.001) ***	0.39%	(0.000) ***
	[-1, 1]	1.40%	(0.001) ***	0.37%	(0.000) ***	1.40%	(0.001) ***	0.39%	(0.000) ***	1.40%	(0.001) ***	0.42%	(0.000) ***
	[0]	1.06%	(0.001) ***	0.20%	(0.000) ***	1.11%	(0.001) ***	0.23%	(0.000) ***	1.05%	(0.001) ***	0.21%	(0.000) ***
	[0, 1]	1.26%	(0.002) ***	0.15%	(0.005) ***	1.30%	(0.001) ***	0.27%	(0.004) ***	1.27%	(0.002) ***	0.19%	(0.004) ***
	[1]	0.20%	(0.508)	-0.03%	(0.948)	0.18%	(0.338)	-0.01%	(0.954)	0.21%	(0.256)	-0.03%	(0.974)
	[1, 3]	0.32%	(0.185)	0.05%	(0.707)	0.41%	(0.110)	0.16%	(0.294)	0.33%	(0.160)	0.00%	(0.497)
Post-event	[1, 5]	0.01%	(0.977)	-0.07%	(0.479)	0.23%	(0.387)	0.14%	(0.791)	0.06%	(0.810)	0.03%	(0.606)
	[1, 10]	-0.29%	(0.419)	-0.28%	(0.202)	0.04%	(0.906)	0.00%	(0.818)	-0.24%	(0.504)	-0.32%	(0.293)
	[4, 5]	-0.31%	(0.077) *	-0.19%	(0.067) *	-0.18%	(0.338)	-0.11%	(0.507)	-0.27%	(0.114)	-0.20%	(0.082) *
	[5, 10]	-0.38%	(0.193)	-0.12%	(0.065) *	-0.26%	(0.397)	-0.05%	(0.417)	-0.36%	(0.226)	-0.17%	(0.080) *

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 16: Strategic alliance announcements

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a strategic alliance. The results are provided by all three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 840 strategic alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 840	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.05%	(0.781)	-0.07%	(0.468)	0.14%	(0.504)	-0.10%	(0.951)	0.07%	(0.727)	-0.06%	(0.545)
	[-10, -1]	0.31%	(0.243)	-0.20%	(0.704)	0.42%	(0.129)	0.07%	(0.913)	0.30%	(0.257)	-0.11%	(0.894)
Pre-event	[-5, -1]	0.22%	(0.350)	-0.34%	(0.223)	0.24%	(0.314)	-0.34%	(0.282)	0.21%	(0.373)	-0.29%	(0.231)
	[-3, -1]	0.19%	(0.319)	-0.13%	(0.439)	0.13%	(0.504)	-0.21%	(0.210)	0.17%	(0.372)	-0.09%	(0.425)
	[-1]	0.10%	(0.440)	-0.07%	(0.067) *	0.06%	(0.641)	-0.08%	(0.080) *	0.10%	(0.423)	-0.09%	(0.071) *
	[-10, 10]	1.11%	(0.015) **	-0.06%	(0.657)	1.46%	(0.001) ***	0.65%	(0.048) **	1.12%	(0.014) **	-0.16%	(0.603)
	[-5, 5]	1.00%	(0.006) ***	-0.09%	(0.359)	1.16%	(0.002) ***	0.15%	(0.062) *	0.99%	(0.007) ***	-0.13%	(0.370)
	[-3, 3]	1.48%	(0.000) ***	-0.01%	(0.019) **	1.49%	(0.000) ***	0.15%	(0.006) ***	1.46%	(0.000) ***	0.04%	(0.014) **
Event	[-1, 0]	1.20%	(0.000) ***	0.16%	(0.000) ***	1.13%	(0.000) ***	0.17%	(0.001) ***	1.21%	(0.000) ***	0.19%	(0.000) ***
	[-1, 1]	1.40%	(0.000) ***	0.16%	(0.001) ***	1.40%	(0.000) ***	0.14%	(0.001) ***	1.41%	(0.000) ***	0.19%	(0.000) ***
	[0]	1.10%	(0.000) ***	0.13%	(0.000) ***	1.07%	(0.000) ***	0.17%	(0.000) ***	1.11%	(0.000) ***	0.13%	(0.000) ***
	[0, 1]	1.30%	(0.000) ***	0.14%	(0.000) ***	1.34%	(0.000) ***	0.21%	(0.000) ***	1.31%	(0.000) ***	0.18%	(0.000) ***
	[1]	0.20%	(0.105)	-0.06%	(0.628)	0.27%	(0.027) **	-0.03%	(0.577)	0.20%	(0.099) *	-0.07%	(0.648)
	[1, 3]	0.18%	(0.308)	-0.24%	(0.214)	0.29%	(0.110)	-0.06%	(0.789)	0.18%	(0.306)	-0.11%	(0.301)
Post-event	[1, 5]	-0.32%	(0.117)	-0.49%	(0.001) ***	-0.14%	(0.486)	-0.26%	(0.077) *	-0.33%	(0.108)	-0.42%	(0.002) ***
	[1, 10]	-0.30%	(0.279)	-0.49%	(0.005) ***	-0.03%	(0.912)	-0.11%	(0.363)	-0.29%	(0.291)	-0.56%	(0.007) ***
	[4, 5]	-0.50%	(0.000) ***	-0.23%	(0.002) ***	-0.43%	(0.003) ***	-0.12%	(0.038) **	-0.51%	(0.000) ***	-0.21%	(0.002) ***
	[5, 10]	-0.31%	(0.169)	-0.33%	(0.007) ***	-0.17%	(0.453)	-0.19%	(0.306)	-0.28%	(0.198)	-0.34%	(0.013) **

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

Table 17: Business alliance announcements by small cap firms

The below table presents the cumulative average abnormal returns (CAAR) of small cap firms announcing a business alliance provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 241 announcements made by small cap firms in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 241	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.03%	(0.964)	-0.87%	(0.302)	0.27%	(0.665)	-0.47%	(0.772)	0.07%	(0.904)	-0.64%	(0.404)
	[-10, -1]	1.80%	(0.047) **	-0.01%	(0.446)	2.11%	(0.021) **	0.42%	(0.216)	1.73%	(0.058) *	0.04%	(0.398)
Pre-event	[-5, -1]	1.71%	(0.030) **	-0.27%	(0.619)	1.86%	(0.017) **	-0.26%	(0.438)	1.63%	(0.040) **	-0.13%	(0.589)
	[-3, -1]	1.69%	(0.018) **	0.01%	(0.167)	1.63%	(0.023) **	-0.05%	(0.178)	1.57%	(0.029) **	0.05%	(0.207)
	[-1]	0.99%	(0.019) **	0.05%	(0.133)	1.00%	(0.019) **	0.07%	(0.076) *	0.96%	(0.022) **	0.01%	(0.166)
	[-10, 10]	5.94%	(0.000) ***	1.20%	(0.014) **	6.07%	(0.000) ***	1.91%	(0.004) ***	5.87%	(0.000) ***	0.71%	(0.015) **
	[-5, 5]	5.44%	(0.000) ***	1.64%	(0.000) ***	5.68%	(0.000) ***	2.35%	(0.000) ***	5.38%	(0.000) ***	1.71%	(0.000) ***
	[-3, 3]	6.73%	(0.000) ***	2.44%	(0.000) ***	6.75%	(0.000) ***	2.77%	(0.000) ***	6.58%	(0.000) ***	2.31%	(0.000) ***
Event	[-1, 0]	4.87%	(0.000) ***	1.23%	(0.000) ***	4.85%	(0.000) ***	1.51%	(0.000) ***	4.84%	(0.000) ***	1.36%	(0.000) ***
	[-1, 1]	5.73%	(0.000) ***	1.64%	(0.000) ***	5.77%	(0.000) ***	1.89%	(0.000) ***	5.71%	(0.000) ***	1.64%	(0.000) ***
	[0]	3.88%	(0.000) ***	0.85%	(0.000) ***	3.86%	(0.000) ***	0.85%	(0.000) ***	3.88%	(0.000) ***	0.85%	(0.000) ***
	[0, 1]	4.74%	(0.000) ***	0.98%	(0.000) ***	4.78%	(0.000) ***	1.25%	(0.000) ***	4.76%	(0.000) ***	1.02%	(0.000) ***
	[1]	0.86%	(0.134)	0.06%	(0.199)	0.92%	(0.023) **	0.13%	(0.112)	0.88%	(0.031) **	0.01%	(0.220)
	[1, 3]	1.15%	(0.032) **	0.23%	(0.269)	1.27%	(0.018) **	0.26%	(0.117)	1.14%	(0.033) **	0.26%	(0.264)
Post-event	[1, 5]	-0.16%	(0.760)	-0.52%	(0.145)	-0.04%	(0.933)	-0.11%	(0.305)	-0.13%	(0.798)	-0.51%	(0.167)
	[1, 10]	0.26%	(0.734)	-0.81%	(0.318)	0.10%	(0.890)	-0.86%	(0.382)	0.26%	(0.727)	-1.06%	(0.318)
	[4, 5]	-1.31%	(0.001) ***	-0.66%	(0.002) ***	-1.31%	(0.001) ***	-0.64%	(0.005) ***	-1.27%	(0.001) ***	-0.65%	(0.003) ***
	[5, 10]	-0.50%	(0.439)	-1.33%	(0.004) ***	-0.82%	(0.208)	-1.13%	(0.006) ***	-0.50%	(0.452)	-1.14%	(0.006) ***

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 18: Business alliance announcements by large cap firms

The below table presents the cumulative average abnormal returns (CAAR) of large cap firms announcing a business alliance provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 791 announcements made by large cap firms in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 791	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.19%	(0.194)	0.18%	(0.169)	0.25%	(0.114)	0.15%	(0.096) *	0.22%	(0.141)	0.19%	(0.091) *
	[-10, -1]	0.00%	(0.995)	-0.03%	(0.883)	0.04%	(0.860)	0.09%	(0.815)	0.04%	(0.862)	0.03%	(0.843)
Pre-event	[-5, -1]	-0.22%	(0.160)	-0.24%	(0.091) *	-0.22%	(0.191)	-0.20%	(0.161)	-0.20%	(0.210)	-0.18%	(0.118)
	[-3, -1]	-0.17%	(0.178)	-0.13%	(0.154)	-0.22%	(0.094) *	-0.15%	(0.078) *	-0.15%	(0.223)	-0.09%	(0.227)
	[-1]	-0.07%	(0.245)	-0.05%	(0.136)	-0.12%	(0.079) *	-0.02%	(0.193)	-0.06%	(0.292)	-0.04%	(0.156)
	[-10, 10]	-0.26%	(0.370)	-0.40%	(0.243)	0.14%	(0.665)	0.26%	(0.511)	-0.22%	(0.458)	-0.29%	(0.343)
	[-5, 5]	-0.20%	(0.364)	-0.33%	(0.203)	-0.03%	(0.891)	-0.02%	(0.889)	-0.17%	(0.453)	-0.28%	(0.270)
	[-3, 3]	0.03%	(0.864)	-0.14%	(0.927)	0.03%	(0.874)	-0.07%	(0.630)	0.06%	(0.755)	-0.15%	(0.833)
Event	[-1, 0]	0.16%	(0.072) *	0.10%	(0.085) *	0.10%	(0.300)	0.12%	(0.210)	0.17%	(0.056) *	0.15%	(0.046) **
	[-1, 1]	0.21%	(0.097) *	0.09%	(0.126)	0.18%	(0.188)	0.10%	(0.166)	0.22%	(0.074) *	0.13%	(0.059) *
	[0]	0.23%	(0.003) ***	0.08%	(0.019) **	0.22%	(0.006) ***	0.06%	(0.085) *	0.23%	(0.002) ***	0.08%	(0.017) **
	[0, 1]	0.27%	(0.013) **	0.08%	(0.033) **	0.29%	(0.015) **	0.11%	(0.072) *	0.28%	(0.011) **	0.08%	(0.020) **
	[1]	0.05%	(0.533)	-0.05%	(0.892)	0.08%	(0.369)	0.00%	(0.633)	0.05%	(0.492)	-0.04%	(0.995)
	[1, 3]	-0.03%	(0.829)	-0.20%	(0.269)	0.04%	(0.770)	0.02%	(0.757)	-0.02%	(0.865)	-0.09%	(0.419)
Post-event	[1, 5]	-0.21%	(0.152)	-0.31%	(0.009) ***	-0.03%	(0.854)	-0.15%	(0.455)	-0.20%	(0.168)	-0.21%	(0.016) **
	[1, 10]	-0.49%	(0.022) **	-0.44%	(0.003) ***	-0.11%	(0.624)	0.05%	(0.634)	-0.49%	(0.021) **	-0.49%	(0.003) ***
	[4, 5]	-0.18%	(0.030) **	-0.16%	(0.017) **	-0.07%	(0.458)	-0.08%	(0.563)	-0.18%	(0.034) **	-0.16%	(0.018) **
	[5, 10]	-0.34%	(0.040) **	-0.10%	(0.044) **	-0.10%	(0.567)	-0.03%	(0.954)	-0.35%	(0.037) **	-0.17%	(0.043) **

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

Table 19: Business alliance announcements by mid-cap firms

The below table presents the cumulative average abnormal returns (CAAR) of mid-cap firms announcing a business alliance provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 232 announcements made by mid-cap firms in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 232	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
Pre-event	[-10, -5]	0.02%	(0.961)	0.25%	(0.664)	0.34%	(0.374)	0.12%	(0.385)	0.04%	(0.904)	0.14%	(0.733)
	[-10, -1]	0.00%	(0.998)	0.40%	(0.587)	0.30%	(0.528)	0.42%	(0.446)	-0.04%	(0.929)	0.41%	(0.698)
	[-5, -1]	-0.07%	(0.831)	-0.64%	(0.385)	0.00%	(0.998)	-0.56%	(0.428)	-0.11%	(0.735)	-0.36%	(0.317)
	[-3, -1]	-0.22%	(0.383)	-0.38%	(0.388)	-0.36%	(0.187)	-0.25%	(0.200)	-0.28%	(0.265)	-0.39%	(0.268)
	[-1]	-0.18%	(0.243)	-0.11%	(0.165)	-0.23%	(0.147)	-0.20%	(0.129)	-0.18%	(0.255)	-0.15%	(0.131)
Event	[-10, 10]	0.91%	(0.221)	1.18%	(0.142)	1.71%	(0.018) **	0.89%	(0.012) **	0.98%	(0.168)	0.85%	(0.109)
	[-5, 5]	0.80%	(0.176)	0.50%	(0.135)	1.21%	(0.048) **	0.72%	(0.080) *	0.77%	(0.188)	0.53%	(0.177)
	[-3, 3]	1.04%	(0.027) **	0.36%	(0.093) *	1.15%	(0.019) **	0.25%	(0.108)	1.00%	(0.031) **	0.38%	(0.114)
	[-1, 0]	0.94%	(0.000) ***	0.38%	(0.007) ***	0.93%	(0.001) ***	0.27%	(0.014) **	0.94%	(0.000) ***	0.39%	(0.004) ***
	[-1, 1]	0.95%	(0.016) **	0.23%	(0.064) *	1.04%	(0.010) **	0.18%	(0.064) *	0.96%	(0.014) **	0.13%	(0.054) *
	[0]	1.12%	(0.000) ***	0.26%	(0.000) ***	1.16%	(0.000) ***	0.53%	(0.000) ***	1.11%	(0.000) ***	0.26%	(0.000) ***
	[0, 1]	1.13%	(0.003) ***	0.18%	(0.042) **	1.27%	(0.001) ***	0.30%	(0.021) **	1.14%	(0.003) ***	0.14%	(0.039) **
Post-event	[1]	0.01%	(0.977)	-0.22%	(0.047) **	0.11%	(0.653)	-0.21%	(0.167)	0.02%	(0.925)	-0.22%	(0.072) *
	[1, 3]	0.14%	(0.688)	-0.24%	(0.313)	0.35%	(0.317)	-0.20%	(0.823)	0.17%	(0.628)	-0.17%	(0.432)
	[1, 5]	-0.24%	(0.594)	-0.32%	(0.366)	0.05%	(0.916)	0.00%	(0.646)	-0.23%	(0.611)	-0.37%	(0.432)
	[1, 10]	-0.21%	(0.690)	-0.23%	(0.683)	0.25%	(0.638)	0.25%	(0.526)	-0.09%	(0.867)	0.04%	(0.928)
	[4, 5]	-0.38%	(0.236)	-0.16%	(0.437)	-0.30%	(0.359)	-0.18%	(0.545)	-0.40%	(0.215)	-0.07%	(0.478)
	[5, 10]	-0.11%	(0.782)	0.01%	(0.870)	0.11%	(0.788)	0.10%	(0.683)	0.01%	(0.972)	0.02%	(0.854)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

Table 20: Business alliance announcements with domestic partners

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance with a domestic partner provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 148 business alliance announcements with a domestic partner in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 148	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
Pre-event	[-10, -5]	0.02%	(0.967)	0.20%	(0.697)	0.15%	(0.727)	-0.16%	(0.821)	-0.05%	(0.898)	0.02%	(0.882)
	[-10, -1]	-0.08%	(0.895)	-0.13%	(0.375)	0.03%	(0.960)	-0.19%	(0.487)	-0.22%	(0.728)	-0.28%	(0.327)
	[-5, -1]	0.08%	(0.884)	-0.60%	(0.084) *	0.19%	(0.726)	-0.49%	(0.138)	0.04%	(0.949)	-0.64%	(0.064) *
	[-3, -1]	0.07%	(0.878)	-0.44%	(0.243)	0.00%	(0.996)	-0.47%	(0.146)	0.01%	(0.984)	-0.34%	(0.170)
	[-1]	0.41%	(0.139)	-0.04%	(0.925)	0.40%	(0.154)	-0.05%	(0.961)	0.42%	(0.127)	0.00%	(0.846)
Event	[-10, 10]	-0.44%	(0.676)	-0.62%	(0.515)	-0.11%	(0.919)	-0.70%	(0.468)	-0.55%	(0.604)	-0.40%	(0.466)
	[-5, 5]	0.84%	(0.382)	-0.01%	(0.472)	0.97%	(0.321)	-0.16%	(0.632)	0.83%	(0.385)	-0.19%	(0.464)
	[-3, 3]	1.75%	(0.067) *	0.24%	(0.328)	1.51%	(0.119)	0.10%	(0.784)	1.76%	(0.064) *	0.35%	(0.230)
	[-1, 0]	1.75%	(0.013) **	0.10%	(0.189)	1.76%	(0.014) **	0.06%	(0.194)	1.77%	(0.012) **	0.13%	(0.105)
	[-1, 1]	2.10%	(0.017) **	-0.20%	(0.371)	2.03%	(0.022) **	-0.07%	(0.479)	2.11%	(0.016) **	-0.21%	(0.311)
	[0]	1.34%	(0.031) **	0.07%	(0.295)	1.36%	(0.032) **	-0.05%	(0.321)	1.35%	(0.031) **	0.06%	(0.277)
	[0, 1]	1.69%	(0.033) **	0.08%	(0.392)	1.63%	(0.043) **	-0.22%	(0.610)	1.69%	(0.034) **	0.13%	(0.343)
Post-event	[1]	0.35%	(0.642)	-0.10%	(0.677)	0.27%	(0.467)	-0.06%	(0.594)	0.34%	(0.353)	-0.07%	(0.757)
	[1, 3]	0.34%	(0.431)	0.13%	(0.583)	0.14%	(0.751)	-0.21%	(0.740)	0.40%	(0.365)	0.30%	(0.347)
	[1, 5]	-0.59%	(0.274)	-0.35%	(0.131)	-0.59%	(0.293)	-0.32%	(0.155)	-0.56%	(0.300)	-0.29%	(0.221)
	[1, 10]	-1.70%	(0.009) ***	-0.50%	(0.122)	-1.50%	(0.024) **	-0.09%	(0.307)	-1.69%	(0.010) **	0.04%	(0.171)
	[4, 5]	-0.93%	(0.004) ***	-0.48%	(0.003) ***	-0.73%	(0.046) **	-0.36%	(0.100) *	-0.96%	(0.004) ***	-0.59%	(0.004) ***
	[5, 10]	-1.42%	(0.006) ***	-0.42%	(0.032) **	-1.15%	(0.033) **	-0.18%	(0.296)	-1.42%	(0.006) ***	-0.58%	(0.043) **

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 21: Business alliance announcements with international partners

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance with an international partner provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 1116 business alliance announcements with an international partner in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 1116	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
Pre-event	[-10, -5]	0.14%	(0.419)	0.07%	(0.708)	0.29%	(0.119)	0.10%	(0.159)	0.19%	(0.292)	0.11%	(0.433)
	[-10, -1]	0.40%	(0.109)	0.07%	(0.436)	0.54%	(0.034) **	0.23%	(0.182)	0.42%	(0.093) *	0.21%	(0.275)
	[-5, -1]	0.19%	(0.347)	-0.25%	(0.292)	0.22%	(0.285)	-0.23%	(0.442)	0.19%	(0.360)	-0.18%	(0.349)
	[-3, -1]	0.19%	(0.268)	-0.13%	(0.590)	0.12%	(0.508)	-0.14%	(0.365)	0.17%	(0.325)	-0.09%	(0.630)
	[-1]	0.07%	(0.453)	-0.05%	(0.217)	0.03%	(0.749)	-0.03%	(0.328)	0.07%	(0.476)	-0.05%	(0.198)
Event	[-10, 10]	1.34%	(0.001) ***	0.15%	(0.201)	1.78%	(0.000) ***	0.78%	(0.001) ***	1.39%	(0.001) ***	0.06%	(0.140)
	[-5, 5]	1.09%	(0.001) ***	0.00%	(0.077) *	1.32%	(0.000) ***	0.53%	(0.001) ***	1.09%	(0.001) ***	0.00%	(0.067) *
	[-3, 3]	1.46%	(0.000) ***	0.16%	(0.001) ***	1.52%	(0.000) ***	0.35%	(0.000) ***	1.44%	(0.000) ***	0.16%	(0.001) ***
	[-1, 0]	1.13%	(0.000) ***	0.29%	(0.000) ***	1.08%	(0.000) ***	0.24%	(0.000) ***	1.12%	(0.000) ***	0.28%	(0.000) ***
	[-1, 1]	1.30%	(0.000) ***	0.28%	(0.000) ***	1.32%	(0.000) ***	0.29%	(0.000) ***	1.31%	(0.000) ***	0.27%	(0.000) ***
	[0]	1.05%	(0.000) ***	0.16%	(0.000) ***	1.05%	(0.000) ***	0.22%	(0.000) ***	1.05%	(0.000) ***	0.17%	(0.000) ***
	[0, 1]	1.23%	(0.000) ***	0.17%	(0.000) ***	1.29%	(0.000) ***	0.27%	(0.000) ***	1.24%	(0.000) ***	0.19%	(0.000) ***
Post-event	[1]	0.18%	(0.094) *	-0.05%	(0.749)	0.24%	(0.026) **	-0.01%	(0.523)	0.19%	(0.076) *	-0.05%	(0.820)
	[1, 3]	0.21%	(0.162)	-0.17%	(0.294)	0.36%	(0.024) **	-0.02%	(0.314)	0.21%	(0.162)	-0.10%	(0.400)
	[1, 5]	-0.16%	(0.340)	-0.34%	(0.006) ***	0.06%	(0.734)	-0.10%	(0.368)	-0.15%	(0.372)	-0.29%	(0.009) ***
	[1, 10]	-0.11%	(0.641)	-0.44%	(0.007) ***	0.19%	(0.416)	-0.04%	(0.771)	-0.08%	(0.718)	-0.52%	(0.011) **
	[4, 5]	-0.37%	(0.002) ***	-0.16%	(0.005) ***	-0.30%	(0.013) **	-0.11%	(0.113)	-0.36%	(0.002) ***	-0.18%	(0.007) ***
	[5, 10]	-0.19%	(0.321)	-0.19%	(0.007) ***	-0.07%	(0.700)	-0.10%	(0.302)	-0.16%	(0.387)	-0.26%	(0.013) **

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

Table 22: Domestic business alliance announcements by the alliance's location

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance where either the firm or its partner, or both, are located in the same country as the business alliance provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 672 domestic business alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 672	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.31%	(0.164)	0.19%	(0.181)	0.47%	(0.042) **	0.12%	(0.085) *	0.36%	(0.107)	0.19%	(0.128)
	[-10, -1]	0.84%	(0.014) **	0.17%	(0.399)	1.02%	(0.003) ***	0.19%	(0.161)	0.86%	(0.012) **	0.22%	(0.245)
Pre-event	[-5, -1]	0.59%	(0.045) **	-0.21%	(0.302)	0.70%	(0.020) **	-0.17%	(0.691)	0.60%	(0.044) **	-0.16%	(0.373)
	[-3, -1]	0.49%	(0.059) *	-0.15%	(0.321)	0.43%	(0.101)	-0.14%	(0.343)	0.47%	(0.069) *	-0.11%	(0.331)
	[-1]	0.25%	(0.107)	-0.03%	(0.620)	0.19%	(0.233)	-0.02%	(0.714)	0.25%	(0.106)	-0.03%	(0.646)
	[-10, 10]	1.50%	(0.010) ***	0.09%	(0.282)	1.98%	(0.001) ***	0.69%	(0.020) **	1.55%	(0.007) ***	0.02%	(0.251)
	[-5, 5]	1.47%	(0.002) ***	-0.11%	(0.336)	1.68%	(0.001) ***	0.09%	(0.063) *	1.49%	(0.002) ***	-0.03%	(0.287)
	[-3, 3]	1.96%	(0.000) ***	0.32%	(0.008) ***	1.94%	(0.000) ***	0.32%	(0.004) ***	1.96%	(0.000) ***	0.33%	(0.004) ***
Event	[-1, 0]	1.36%	(0.000) ***	0.26%	(0.000) ***	1.30%	(0.000) ***	0.26%	(0.000) ***	1.35%	(0.000) ***	0.29%	(0.000) ***
	[-1, 1]	1.68%	(0.000) ***	0.29%	(0.000) ***	1.62%	(0.000) ***	0.20%	(0.001) ***	1.67%	(0.000) ***	0.25%	(0.000) ***
	[0]	1.11%	(0.000) ***	0.11%	(0.000) ***	1.11%	(0.000) ***	0.15%	(0.000) ***	1.11%	(0.000) ***	0.12%	(0.000) ***
	[0, 1]	1.43%	(0.000) ***	0.15%	(0.000) ***	1.43%	(0.000) ***	0.23%	(0.000) ***	1.42%	(0.000) ***	0.16%	(0.000) ***
	[1]	0.31%	(0.145)	0.02%	(0.455)	0.32%	(0.042) **	0.03%	(0.370)	0.32%	(0.046) **	-0.01%	(0.459)
	[1, 3]	0.36%	(0.080) *	0.02%	(0.636)	0.40%	(0.060) *	0.16%	(0.237)	0.38%	(0.062) *	0.07%	(0.373)
Post-event	[1, 5]	-0.24%	(0.287)	-0.27%	(0.041) **	-0.14%	(0.564)	-0.10%	(0.332)	-0.21%	(0.354)	-0.17%	(0.078) *
	[1, 10]	-0.46%	(0.143)	-0.43%	(0.029) **	-0.15%	(0.643)	0.05%	(0.666)	-0.42%	(0.181)	-0.43%	(0.044) **
	[4, 5]	-0.60%	(0.000) ***	-0.29%	(0.000) ***	-0.53%	(0.002) ***	-0.24%	(0.011) **	-0.59%	(0.000) ***	-0.31%	(0.001) ***
	[5, 10]	-0.50%	(0.052) *	-0.29%	(0.006) ***	-0.26%	(0.325)	-0.05%	(0.394)	-0.48%	(0.063) *	-0.40%	(0.007) ***

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 23: International business alliance announcements by the alliance's location

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance where the firm, its partner, and the business alliance are all located in a different country provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 592 international business alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 592	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	-0.08%	(0.743)	-0.17%	(0.455)	0.05%	(0.856)	-0.01%	(0.879)	-0.07%	(0.771)	-0.04%	(0.588)
	[-10, -1]	-0.22%	(0.462)	-0.17%	(0.765)	-0.13%	(0.688)	0.11%	(0.964)	-0.24%	(0.424)	-0.07%	(0.791)
Pre-event	[-5, -1]	-0.29%	(0.194)	-0.37%	(0.223)	-0.33%	(0.153)	-0.39%	(0.173)	-0.32%	(0.164)	-0.31%	(0.187)
	[-3, -1]	-0.17%	(0.366)	-0.13%	(0.782)	-0.27%	(0.176)	-0.18%	(0.343)	-0.21%	(0.275)	-0.08%	(0.726)
	[-1]	-0.04%	(0.704)	-0.06%	(0.264)	-0.05%	(0.626)	-0.05%	(0.343)	-0.04%	(0.671)	-0.06%	(0.225)
	[-10, 10]	0.72%	(0.127)	0.12%	(0.770)	1.08%	(0.022) **	0.67%	(0.067) *	0.72%	(0.128)	-0.03%	(0.645)
	[-5, 5]	0.59%	(0.080) *	0.07%	(0.292)	0.84%	(0.014) **	0.60%	(0.025) **	0.57%	(0.090) *	0.01%	(0.288)
	[-3, 3]	0.97%	(0.001) ***	0.05%	(0.025) **	1.04%	(0.001) ***	0.27%	(0.008) ***	0.93%	(0.002) ***	0.11%	(0.028) **
Event	[-1, 0]	1.02%	(0.000) ***	0.26%	(0.000) ***	1.00%	(0.000) ***	0.22%	(0.001) ***	1.02%	(0.000) ***	0.26%	(0.000) ***
	[-1, 1]	1.08%	(0.000) ***	0.21%	(0.002) ***	1.16%	(0.000) ***	0.31%	(0.000) ***	1.10%	(0.000) ***	0.22%	(0.001) ***
	[0]	1.05%	(0.000) ***	0.18%	(0.000) ***	1.05%	(0.000) ***	0.23%	(0.000) ***	1.07%	(0.000) ***	0.18%	(0.000) ***
	[0, 1]	1.12%	(0.000) ***	0.14%	(0.001) ***	1.21%	(0.000) ***	0.25%	(0.000) ***	1.15%	(0.000) ***	0.23%	(0.000) ***
	[1]	0.06%	(0.610)	-0.12%	(0.143)	0.15%	(0.240)	-0.08%	(0.736)	0.08%	(0.522)	-0.09%	(0.195)
	[1, 3]	0.08%	(0.683)	-0.33%	(0.087) *	0.26%	(0.215)	-0.11%	(0.949)	0.07%	(0.730)	-0.31%	(0.092) *
Post-event	[1, 5]	-0.17%	(0.441)	-0.39%	(0.018) **	0.12%	(0.609)	-0.14%	(0.362)	-0.18%	(0.417)	-0.34%	(0.019) **
	[1, 10]	-0.11%	(0.725)	-0.48%	(0.036) **	0.16%	(0.613)	-0.16%	(0.670)	-0.10%	(0.726)	-0.56%	(0.047) **
	[4, 5]	-0.25%	(0.078) *	-0.12%	(0.111)	-0.14%	(0.337)	-0.06%	(0.797)	-0.25%	(0.084) *	-0.12%	(0.122)
	[5, 10]	-0.14%	(0.566)	-0.17%	(0.067) *	-0.13%	(0.594)	-0.24%	(0.313)	-0.12%	(0.627)	-0.23%	(0.133)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

Table 24: Business alliances announced by related partners

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance with a related partner where the firm and the partner share the same primary three-digit SIC code provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 391 business alliance announcements made by related partners in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 391	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
Pre-event	[-10, -5]	0.25%	(0.382)	0.23%	(0.526)	0.43%	(0.144)	0.40%	(0.172)	0.35%	(0.218)	0.44%	(0.286)
	[-10, -1]	0.09%	(0.831)	0.09%	(0.856)	0.29%	(0.504)	0.12%	(0.956)	0.11%	(0.798)	0.21%	(0.982)
	[-5, -1]	-0.09%	(0.813)	-0.27%	(0.248)	-0.03%	(0.930)	-0.33%	(0.208)	-0.13%	(0.728)	-0.36%	(0.229)
	[-3, -1]	-0.15%	(0.626)	-0.30%	(0.146)	-0.26%	(0.413)	-0.36%	(0.052) *	-0.23%	(0.474)	-0.25%	(0.125)
	[-1]	-0.08%	(0.603)	-0.04%	(0.275)	-0.15%	(0.333)	-0.08%	(0.105)	-0.09%	(0.565)	-0.04%	(0.308)
Event	[-10, 10]	1.57%	(0.041) **	0.17%	(0.414)	2.10%	(0.005) ***	0.77%	(0.039) **	1.64%	(0.030) **	0.04%	(0.366)
	[-5, 5]	1.38%	(0.019) **	0.09%	(0.183)	1.57%	(0.008) ***	0.09%	(0.079) *	1.34%	(0.022) **	0.09%	(0.225)
	[-3, 3]	1.84%	(0.000) ***	0.21%	(0.029) **	1.74%	(0.001) ***	0.08%	(0.047) **	1.75%	(0.001) ***	0.33%	(0.038) **
	[-1, 0]	1.58%	(0.000) ***	0.29%	(0.001) ***	1.47%	(0.000) ***	0.29%	(0.004) ***	1.60%	(0.000) ***	0.39%	(0.000) ***
	[-1, 1]	1.71%	(0.000) ***	0.21%	(0.005) ***	1.64%	(0.000) ***	0.11%	(0.010) ***	1.74%	(0.000) ***	0.30%	(0.001) ***
	[0]	1.66%	(0.000) ***	0.25%	(0.000) ***	1.62%	(0.000) ***	0.27%	(0.000) ***	1.68%	(0.000) ***	0.31%	(0.000) ***
	[0, 1]	1.79%	(0.000) ***	0.26%	(0.001) ***	1.79%	(0.000) ***	0.24%	(0.003) ***	1.82%	(0.000) ***	0.31%	(0.000) ***
Post-event	[1]	0.12%	(0.704)	-0.11%	(0.507)	0.17%	(0.412)	-0.06%	(0.761)	0.14%	(0.496)	-0.11%	(0.594)
	[1, 3]	0.33%	(0.246)	-0.32%	(0.295)	0.39%	(0.182)	-0.29%	(0.483)	0.29%	(0.303)	-0.27%	(0.335)
	[1, 5]	-0.19%	(0.532)	-0.47%	(0.052) *	-0.01%	(0.969)	-0.45%	(0.127)	-0.21%	(0.503)	-0.45%	(0.055) *
	[1, 10]	-0.19%	(0.667)	-0.43%	(0.213)	0.19%	(0.660)	0.01%	(0.964)	-0.15%	(0.724)	-0.40%	(0.269)
	[4, 5]	-0.52%	(0.034) **	-0.19%	(0.079) *	-0.40%	(0.104)	-0.11%	(0.326)	-0.50%	(0.039) **	-0.18%	(0.101)
	[5, 10]	-0.34%	(0.335)	-0.15%	(0.103)	-0.10%	(0.781)	0.10%	(0.910)	-0.27%	(0.450)	-0.25%	(0.171)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

Table 25: Business alliances announced by unrelated partners

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance with an unrelated partner where the firm and the partner do not share the same primary three-digit SIC code provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 873 business alliance announcements made by unrelated partners in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 873	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.07%	(0.713)	0.02%	(0.879)	0.20%	(0.336)	-0.10%	(0.490)	0.07%	(0.719)	-0.03%	(0.897)
	[-10, -1]	0.45%	(0.094) *	-0.03%	(0.554)	0.56%	(0.045) **	0.18%	(0.247)	0.45%	(0.100) *	0.01%	(0.455)
Pre-event	[-5, -1]	0.30%	(0.181)	-0.27%	(0.246)	0.33%	(0.146)	-0.23%	(0.547)	0.30%	(0.172)	-0.19%	(0.299)
	[-3, -1]	0.33%	(0.088) *	-0.08%	(0.947)	0.27%	(0.170)	-0.08%	(0.778)	0.32%	(0.090) *	-0.04%	(0.954)
	[-1]	0.20%	(0.089) *	-0.05%	(0.547)	0.18%	(0.147)	-0.01%	(0.985)	0.20%	(0.086) *	-0.04%	(0.496)
	[-10, 10]	0.94%	(0.028) **	0.06%	(0.556)	1.31%	(0.002) ***	0.50%	(0.035) **	0.95%	(0.027) **	0.00%	(0.470)
	[-5, 5]	0.91%	(0.008) ***	-0.09%	(0.420)	1.15%	(0.001) ***	0.55%	(0.020) **	0.93%	(0.007) ***	-0.09%	(0.319)
	[-3, 3]	1.34%	(0.000) ***	0.19%	(0.006) ***	1.42%	(0.000) ***	0.36%	(0.001) ***	1.35%	(0.000) ***	0.20%	(0.003) ***
Event	[-1, 0]	1.03%	(0.000) ***	0.23%	(0.000) ***	1.02%	(0.000) ***	0.23%	(0.000) ***	1.02%	(0.000) ***	0.24%	(0.000) ***
	[-1, 1]	1.26%	(0.000) ***	0.27%	(0.000) ***	1.30%	(0.000) ***	0.27%	(0.000) ***	1.26%	(0.000) ***	0.21%	(0.000) ***
	[0]	0.83%	(0.000) ***	0.13%	(0.000) ***	0.84%	(0.000) ***	0.15%	(0.000) ***	0.82%	(0.000) ***	0.13%	(0.000) ***
	[0, 1]	1.06%	(0.000) ***	0.11%	(0.000) ***	1.12%	(0.000) ***	0.24%	(0.000) ***	1.06%	(0.000) ***	0.15%	(0.000) ***
	[1]	0.23%	(0.046) **	-0.03%	(0.974)	0.28%	(0.020) **	0.00%	(0.447)	0.23%	(0.043) **	-0.03%	(0.989)
	[1, 3]	0.18%	(0.268)	-0.05%	(0.850)	0.30%	(0.074) *	0.17%	(0.128)	0.21%	(0.206)	-0.03%	(0.892)
Post-event	[1, 5]	-0.21%	(0.242)	-0.24%	(0.018) **	-0.02%	(0.916)	0.01%	(0.551)	-0.19%	(0.299)	-0.18%	(0.033) **
	[1, 10]	-0.34%	(0.170)	-0.47%	(0.005) ***	-0.09%	(0.714)	-0.10%	(0.475)	-0.32%	(0.192)	-0.54%	(0.008) ***
	[4, 5]	-0.39%	(0.001) ***	-0.23%	(0.001) ***	-0.32%	(0.009) ***	-0.12%	(0.065) *	-0.40%	(0.001) ***	-0.22%	(0.001) ***
	[5, 10]	-0.33%	(0.106)	-0.27%	(0.004) ***	-0.25%	(0.243)	-0.20%	(0.141)	-0.33%	(0.103)	-0.34%	(0.005) ***

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 26: Related business alliance announcements

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance where the firm or its partner share a primary three-digit SIC code with the announced business alliance, provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 550 related business alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 550	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.55%	(0.014) **	0.28%	(0.026) **	0.70%	(0.002) ***	0.27%	(0.008) ***	0.59%	(0.008) ***	0.27%	(0.015) **
	[-10, -1]	0.50%	(0.129)	0.24%	(0.301)	0.58%	(0.073) *	0.34%	(0.159)	0.51%	(0.121)	0.42%	(0.219)
Pre-event	[-5, -1]	-0.19%	(0.472)	-0.42%	(0.079) *	-0.18%	(0.507)	-0.42%	(0.101)	-0.20%	(0.439)	-0.39%	(0.069) *
	[-3, -1]	-0.03%	(0.901)	-0.17%	(0.141)	-0.11%	(0.621)	-0.26%	(0.045) **	-0.05%	(0.816)	-0.15%	(0.112)
	[-1]	0.02%	(0.863)	-0.11%	(0.180)	0.02%	(0.882)	-0.04%	(0.459)	0.02%	(0.847)	-0.14%	(0.177)
	[-10, 10]	1.14%	(0.033) **	-0.15%	(0.924)	1.50%	(0.005) ***	0.25%	(0.162)	1.16%	(0.030) **	-0.13%	(0.845)
	[-5, 5]	0.61%	(0.128)	-0.16%	(0.775)	0.77%	(0.055) *	-0.01%	(0.568)	0.62%	(0.124)	-0.23%	(0.709)
	[-3, 3]	0.93%	(0.011) **	-0.12%	(0.680)	0.88%	(0.017) **	-0.19%	(0.426)	0.93%	(0.010) **	-0.24%	(0.672)
Event	[-1, 0]	0.76%	(0.001) ***	0.09%	(0.079) *	0.76%	(0.002) ***	0.17%	(0.036) **	0.76%	(0.001) ***	0.08%	(0.092) *
	[-1, 1]	0.95%	(0.001) ***	0.08%	(0.099) *	1.01%	(0.000) ***	0.16%	(0.037) **	0.96%	(0.000) ***	0.09%	(0.067) *
	[0]	0.74%	(0.001) ***	0.08%	(0.023) **	0.74%	(0.001) ***	0.11%	(0.015) **	0.74%	(0.001) ***	0.07%	(0.028) **
	[0, 1]	0.93%	(0.000) ***	0.03%	(0.105)	0.99%	(0.000) ***	0.12%	(0.029) **	0.94%	(0.000) ***	0.05%	(0.065) *
	[1]	0.19%	(0.400)	-0.06%	(0.569)	0.25%	(0.074) *	-0.01%	(0.635)	0.20%	(0.132)	-0.05%	(0.721)
	[1, 3]	0.21%	(0.290)	-0.06%	(0.593)	0.25%	(0.236)	-0.02%	(0.723)	0.24%	(0.241)	-0.04%	(0.828)
Post-event	[1, 5]	0.06%	(0.792)	-0.19%	(0.135)	0.21%	(0.343)	0.02%	(0.719)	0.08%	(0.706)	-0.10%	(0.192)
	[1, 10]	-0.10%	(0.753)	-0.44%	(0.050) *	0.17%	(0.585)	0.02%	(0.744)	-0.09%	(0.779)	-0.48%	(0.066) *
	[4, 5]	-0.16%	(0.264)	-0.19%	(0.088) *	-0.04%	(0.780)	-0.09%	(0.716)	-0.16%	(0.275)	-0.18%	(0.103)
	[5, 10]	-0.35%	(0.147)	-0.33%	(0.001) ***	-0.17%	(0.490)	-0.18%	(0.118)	-0.37%	(0.136)	-0.34%	(0.002) ***

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$
** $p < .05$
*** $p < .01$

Table 27: Unrelated business alliance announcements

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a business alliance where the firm and its partner do not share a primary three-digit SIC code with the announced business alliance, provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 714 unrelated business alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 714	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	-0.20%	(0.397)	-0.14%	(0.202)	-0.06%	(0.815)	-0.11%	(0.594)	-0.17%	(0.460)	-0.16%	(0.284)
	[-10, -1]	0.22%	(0.489)	-0.15%	(0.720)	0.40%	(0.235)	0.05%	(0.926)	0.22%	(0.500)	-0.07%	(0.848)
Pre-event	[-5, -1]	0.46%	(0.089) *	-0.21%	(0.574)	0.52%	(0.058) *	-0.14%	(0.856)	0.45%	(0.092) *	-0.14%	(0.672)
	[-3, -1]	0.34%	(0.157)	-0.08%	(0.950)	0.27%	(0.271)	-0.04%	(0.953)	0.31%	(0.195)	-0.02%	(0.892)
	[-1]	0.19%	(0.176)	-0.03%	(0.778)	0.12%	(0.397)	-0.03%	(0.573)	0.18%	(0.189)	-0.01%	(0.729)
	[-10, 10]	1.13%	(0.033) **	0.29%	(0.236)	1.61%	(0.003) ***	0.90%	(0.008) ***	1.16%	(0.027) **	0.09%	(0.188)
	[-5, 5]	1.40%	(0.001) ***	0.10%	(0.037) **	1.68%	(0.000) ***	0.70%	(0.001) ***	1.40%	(0.001) ***	0.20%	(0.023) **
	[-3, 3]	1.93%	(0.000) ***	0.40%	(0.000) ***	2.01%	(0.000) ***	0.67%	(0.000) ***	1.90%	(0.000) ***	0.55%	(0.000) ***
Event	[-1, 0]	1.54%	(0.000) ***	0.36%	(0.000) ***	1.47%	(0.000) ***	0.29%	(0.000) ***	1.54%	(0.000) ***	0.38%	(0.000) ***
	[-1, 1]	1.74%	(0.000) ***	0.38%	(0.000) ***	1.71%	(0.000) ***	0.34%	(0.000) ***	1.75%	(0.000) ***	0.37%	(0.000) ***
	[0]	1.35%	(0.000) ***	0.22%	(0.000) ***	1.35%	(0.000) ***	0.23%	(0.000) ***	1.36%	(0.000) ***	0.25%	(0.000) ***
	[0, 1]	1.56%	(0.000) ***	0.29%	(0.000) ***	1.59%	(0.000) ***	0.32%	(0.000) ***	1.57%	(0.000) ***	0.28%	(0.000) ***
	[1]	0.20%	(0.173)	-0.06%	(0.915)	0.24%	(0.109)	-0.02%	(0.890)	0.21%	(0.163)	-0.05%	(0.879)
	[1, 3]	0.24%	(0.236)	-0.14%	(0.558)	0.39%	(0.057) *	-0.06%	(0.422)	0.23%	(0.249)	-0.09%	(0.670)
Post-event	[1, 5]	-0.41%	(0.071) *	-0.43%	(0.006) ***	-0.19%	(0.414)	-0.26%	(0.137)	-0.41%	(0.073) *	-0.49%	(0.008) ***
	[1, 10]	-0.45%	(0.144)	-0.43%	(0.020) **	-0.14%	(0.653)	-0.11%	(0.600)	-0.41%	(0.171)	-0.47%	(0.032) **
	[4, 5]	-0.65%	(0.000) ***	-0.24%	(0.001) ***	-0.59%	(0.001) ***	-0.13%	(0.016) **	-0.64%	(0.000) ***	-0.23%	(0.001) ***
	[5, 10]	-0.31%	(0.212)	-0.15%	(0.105)	-0.22%	(0.392)	-0.07%	(0.665)	-0.27%	(0.287)	-0.25%	(0.172)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 28: High-technology business alliances

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a high-technology business alliance where the alliance's three-digit SIC code matches with the high-technology criteria provided by Kile and Philips (2009) provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 511 high-technology business alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 511	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.29%	(0.257)	0.19%	(0.253)	0.54%	(0.042) **	0.36%	(0.026) **	0.30%	(0.232)	0.18%	(0.199)
	[-10, -1]	0.18%	(0.603)	-0.01%	(0.651)	0.38%	(0.274)	0.41%	(0.195)	0.21%	(0.539)	0.06%	(0.444)
Pre-event	[-5, -1]	-0.12%	(0.658)	-0.38%	(0.093) *	-0.08%	(0.762)	-0.51%	(0.142)	-0.09%	(0.740)	-0.40%	(0.109)
	[-3, -1]	-0.13%	(0.550)	-0.23%	(0.210)	-0.23%	(0.302)	-0.35%	(0.067) *	-0.12%	(0.593)	-0.19%	(0.249)
	[-1]	-0.04%	(0.732)	-0.11%	(0.117)	-0.05%	(0.660)	-0.04%	(0.396)	-0.02%	(0.861)	-0.10%	(0.190)
	[-10, 10]	0.33%	(0.564)	-0.41%	(0.557)	0.99%	(0.083) *	0.26%	(0.286)	0.38%	(0.498)	-0.38%	(0.714)
	[-5, 5]	0.37%	(0.369)	-0.23%	(0.676)	0.70%	(0.097) *	-0.15%	(0.661)	0.41%	(0.328)	-0.31%	(0.687)
	[-3, 3]	0.75%	(0.045) **	-0.45%	(0.812)	0.78%	(0.042) **	-0.06%	(0.482)	0.79%	(0.036) **	-0.34%	(0.693)
Event	[-1, 0]	0.78%	(0.002) ***	0.08%	(0.176)	0.78%	(0.003) ***	0.10%	(0.110)	0.82%	(0.001) ***	0.14%	(0.062) *
	[-1, 1]	0.79%	(0.004) ***	-0.01%	(0.298)	0.86%	(0.002) ***	0.09%	(0.120)	0.85%	(0.002) ***	0.05%	(0.109)
	[0]	0.82%	(0.001) ***	0.09%	(0.014) **	0.83%	(0.000) ***	0.12%	(0.013) **	0.84%	(0.000) ***	0.10%	(0.006) ***
	[0, 1]	0.83%	(0.001) ***	0.05%	(0.043) **	0.91%	(0.000) ***	0.12%	(0.010) ***	0.87%	(0.001) ***	0.11%	(0.019) **
	[1]	0.02%	(0.946)	-0.09%	(0.361)	0.08%	(0.506)	-0.03%	(0.798)	0.03%	(0.778)	-0.09%	(0.463)
	[1, 3]	0.07%	(0.752)	-0.24%	(0.376)	0.18%	(0.401)	-0.02%	(0.684)	0.06%	(0.766)	-0.10%	(0.432)
	[1, 5]	-0.33%	(0.169)	-0.46%	(0.009) ***	-0.05%	(0.832)	-0.17%	(0.262)	-0.35%	(0.148)	-0.35%	(0.013) **
Post-event	[1, 10]	-0.67%	(0.053) *	-0.54%	(0.007) ***	-0.23%	(0.516)	-0.09%	(0.409)	-0.66%	(0.052) *	-0.61%	(0.007) ***
	[4, 5]	-0.39%	(0.029) **	-0.24%	(0.019) **	-0.23%	(0.215)	-0.12%	(0.358)	-0.41%	(0.025) **	-0.25%	(0.018) **
	[5, 10]	-0.59%	(0.032) **	-0.45%	(0.000) ***	-0.36%	(0.192)	-0.47%	(0.068) *	-0.56%	(0.039) **	-0.51%	(0.001) ***

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 29: Non-high-technology business alliances

The below table presents the cumulative average abnormal returns (CAAR) of firms announcing a non-high-technology business alliance where the alliance's three-digit SIC code does not match with the high-tech criteria provided by Kile and Philips (2009) provided by all the three estimation models for different event windows. The models are the market model, market-adjusted model, and the Dimson beta model, respectively. Defining the announcement day as day zero [0], the estimation period for the model estimates begins on day -260 and ends on day –11 [-260, -11]. The sample consists of 753 non-high-technology business alliance announcements in the Nordic stock market during 2000-2018.

		Market model CAAR				*Market-adjusted model CAAR*				*Dimson beta model CAAR*			
N = 753	**Event window**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**	**Mean**	**p[a]**	**Median**	**p[b]**
	[-10, -5]	0.02%	(0.919)	0.01%	(0.759)	0.09%	(0.694)	-0.06%	(0.922)	0.06%	(0.776)	0.04%	(0.968)
	[-10, -1]	0.46%	(0.148)	0.04%	(0.887)	0.55%	(0.087) *	-0.07%	(0.764)	0.44%	(0.165)	0.09%	(0.815)
Pre-event	[-5, -1]	0.38%	(0.148)	-0.21%	(0.503)	0.42%	(0.111)	-0.14%	(0.717)	0.34%	(0.195)	-0.12%	(0.511)
	[-3, -1]	0.39%	(0.092) *	-0.07%	(0.895)	0.34%	(0.154)	-0.06%	(0.827)	0.34%	(0.148)	-0.06%	(0.789)
	[-1]	0.22%	(0.103)	-0.03%	(0.879)	0.16%	(0.235)	-0.03%	(0.622)	0.20%	(0.134)	-0.03%	(0.681)
	[-10, 10]	1.68%	(0.001) ***	0.47%	(0.090) *	1.94%	(0.000) ***	0.90%	(0.004) ***	1.69%	(0.001) ***	0.35%	(0.079) *
	[-5, 5]	1.52%	(0.000) ***	0.26%	(0.028) **	1.68%	(0.000) ***	0.71%	(0.001) ***	1.50%	(0.000) ***	0.36%	(0.024) **
	[-3, 3]	1.99%	(0.000) ***	0.49%	(0.000) ***	2.02%	(0.000) ***	0.59%	(0.000) ***	1.94%	(0.000) ***	0.58%	(0.000) ***
Event	[-1, 0]	1.49%	(0.000) ***	0.37%	(0.000) ***	1.41%	(0.000) ***	0.32%	(0.000) ***	1.46%	(0.000) ***	0.37%	(0.000) ***
	[-1, 1]	1.81%	(0.000) ***	0.39%	(0.000) ***	1.77%	(0.000) ***	0.40%	(0.000) ***	1.78%	(0.000) ***	0.41%	(0.000) ***
	[0]	1.27%	(0.000) ***	0.24%	(0.000) ***	1.25%	(0.000) ***	0.24%	(0.000) ***	1.26%	(0.000) ***	0.22%	(0.000) ***
	[0, 1]	1.59%	(0.000) ***	0.24%	(0.000) ***	1.61%	(0.000) ***	0.26%	(0.000) ***	1.58%	(0.000) ***	0.22%	(0.000) ***
	[1]	0.32%	(0.038) **	-0.03%	(0.866)	0.36%	(0.023) **	-0.02%	(0.442)	0.32%	(0.037) **	-0.04%	(0.887)
	[1, 3]	0.34%	(0.085) *	-0.09%	(0.747)	0.43%	(0.032) **	-0.07%	(0.459)	0.35%	(0.073) *	-0.06%	(0.990)
Post-event	[1, 5]	-0.13%	(0.549)	-0.29%	(0.070) *	0.01%	(0.981)	-0.09%	(0.431)	-0.09%	(0.658)	-0.18%	(0.099) *
	[1, 10]	-0.04%	(0.882)	-0.32%	(0.092) *	0.14%	(0.617)	-0.06%	(0.895)	0.00%	(0.990)	-0.36%	(0.151)
	[4, 5]	-0.46%	(0.001) ***	-0.19%	(0.005) ***	-0.43%	(0.003) ***	-0.11%	(0.055) *	-0.44%	(0.001) ***	-0.20%	(0.008) ***
	[5, 10]	-0.16%	(0.496)	-0.10%	(0.166)	-0.09%	(0.703)	0.01%	(0.877)	-0.14%	(0.544)	-0.15%	(0.200)

[a] Numbers in parantheses represent p-values for the null hypothesis that the cross-sectional mean is zero using the traditional two-tailed t-test.

[b] The statistical significance for the median is obtained with Wilcoxon signed-ranks test for a single sample using the normal distribution approximation. Numbers in parantheses represent the p-values for the null hypothesis that the median is zero.

* $p < .10$

** $p < .05$

*** $p < .01$